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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 35170-2024

Replacing GB/T 35170-2017

**Combustible material preprocessed from CMSW for
co-processing in cement kiln**

水泥窑协同处置的生活垃圾预处理可燃物

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1 Scope

The document lays down the grading requirements, the grading code, the test methods, the inspection rules and the transport and storage of the combustible material preprocessed

from municipal solid waste that is co-processed in a cement kiln.

It applies to the pattern in which household waste is processed before being disposed of in a cement kiln. It does not apply to the pattern in which waste goes into the kiln untreated.

The normative references are GB/T 176 on methods of chemical analysis of cement, GB/T 214 on the determination of total sulfur in coal, GB 4915 on emission of air pollutants from the cement industry, GB/T 6003.2 on perforated plate test sieves, GB 30485 on pollution control for the co-processing of solid waste in cement kilns, GB/T 30760 on the technical rules for that co-processing, GB/T 34615 on methods for testing the combustion characteristics of the material, GB/T 35171 on its sampling and sample preparation, CJ/T 96 on general methods for testing the chemical characteristics of household waste, and CJ/T 313 on the sampling and analysis of household waste.

3 Terms and definitions

The terms and definitions of GB 30485 and GB/T 30760 apply, together with one term defined here.

3.1 combustible material preprocessed from municipal solid waste, abbreviated CMSW: the combustible material obtained by preprocessing household waste of a known origin, able to supply a certain quantity of heat during co-processing. A note adds that the material does not include the hazardous wastes of the National Catalogue of Hazardous Wastes.

4 Grading requirements

4.1 Net calorific value as received. The material is graded on its net calorific value as received into five grades. Grade 1 is a net calorific value of not less than 25 MJ/kg, grade 2 not less than 20 MJ/kg, grade 3 not less than 15 MJ/kg, grade 4 not less than 10 MJ/kg and grade 5 not less than 6 MJ/kg.

4.2 Chlorine content on an air dried basis. Three grades: grade 1 not more than 0.5 percent, grade 2 not more than 1.0 percent, grade 3 not more than 2.0 percent.

4.3 Moisture content as received. Three grades: grade 1 not more than 10 percent, grade 2 not more than 20 percent, grade 3 not more than 40 percent.

4.4 Ash on an air dried basis. Three grades: grade 1 not more than 10 percent, grade 2 not more than 20 percent, grade 3 not more than 50 percent.

4.5 Particle size as received. Three grades, expressed as cumulative residue on a round-hole sieve: grade 1, not more than 15 percent on the 10 mm sieve; grade 2, not more than 20 percent on the 50 mm sieve; grade 3, not more than 20 percent on the 100 mm sieve.

5 Grading code

The material is graded on the five indicators net calorific value as received, chlorine content on an air dried basis, moisture content as received, ash on an air dried basis and particle size as received. The five carry equal weight, so that no single grade decides the code.

The grading code has to be entered in the performance parameter table of Annex A. Figure 1 shows the structure of the code, which strings the five indicator symbols each followed by its grade number, joined by hyphens.

The worked example given in the document is a material tested and calculated as follows: net calorific value as received 12, chlorine content on an air dried basis 0.8 percent, moisture content as received 30 percent, ash on an air dried basis 25 percent, particle size as received a cumulative residue of 18 percent on the 50 mm round-hole sieve. Its grading code is grade 4 for calorific value, grade 2 for chlorine, grade 3 for moisture, grade 3 for ash and grade 2 for particle size. The unit printed against the calorific value of the example is kJ/kg, which does not agree with the MJ/kg of 4.1; the figure is reported here as it is printed.

6 Test methods

6.1 Net calorific value as received. The gross calorific value as received is determined according to GB/T 34615 and converted to the net calorific value as received through the moisture content, by formula (1). The formula was too badly damaged in the extraction to be reproduced here; its legend is given instead. $Q_{net,ar}$ is the net calorific value as received, in kilojoules per kilogram; 0.93 is an empirical constant; $Q_{gr,ar}$ is the gross calorific value as received, in kilojoules per kilogram; 24.4 is the constant for the heat of condensation of water, in kilojoules per kilogram; and M_{ar} is the moisture content as received, as a percentage.

6.2 Chlorine content on an air dried basis is determined according to CJ/T 96.

6.3 Moisture content as received is determined according to CJ/T 313. The test portion is 500 g plus or minus 2 g, dried at 105 degrees C for 9 h to 10 h, the test being completed within 24 h of the sample being sealed. The tolerance printed on the drying temperature came out of the extraction as a plus sign followed by 5 degrees C and could not be read with certainty; it is not reproduced here.

6.4 Ash on an air dried basis is determined according to GB/T 34615.

6.5 Particle size as received is determined according to Annex B.

7 Inspection rules

7.1 Batching and sampling. Before release from the works the material is batched and

sampled by the region the waste comes from; a batch does not exceed 700 t and each batch is one sampling unit. Sampling follows GB/T 35171, and not less than 40 kg is taken from each batch.

7.2 Inspection. The scope of the works inspection is everything laid down in Clause 5. The scope of the type inspection is everything laid down in Clause 5 together with every item of Annex A. A type inspection has to be carried out where the raw material or the process changes appreciably in a way that may affect the properties of the product; where a new product is being trial-produced or production resumes after a long stoppage; where the works inspection result differs appreciably from the last type inspection; and, in normal production, once every 6 months.

7.3 Rules of judgement. A result meeting the requirements of Clause 5 is a conforming product. A result failing any one of the indicators of Clause 5 is a non-conforming product.

7.4 Inspection report. The report has to carry the batch number, the grading code, the items inspected and any other technical requirement agreed in the contract.

7.5 Release from the works. The material may be released only where every technical indicator of the works inspection is met. On release the supplier has to provide the works inspection report and the relevant content of Annex A.

7.6 Delivery and acceptance. In preparing, delivering and accepting the material the user should draw up protective measures suited to the environment and to the process used, and make sure that the pollutants emitted when the material burns in the combustion installation satisfy GB 4915 and GB 30485. Acceptance of quality on delivery rests on the test result of the physical sample drawn, or on the supplier's inspection report for the same batch; which of the two is used is agreed between the parties and noted in the contract, and the supplier has the duty of telling the buyer the method of acceptance. Where there is no written contract, or the contract does not name the method, the supplier has to write on the invoice that acceptance rests on the works inspection report for the same batch. Where acceptance rests on the physical sample, the two parties sample and seal jointly before dispatch or at the place of delivery; sampling follows GB/T 35171, 80 kg is taken and divided into 2 equal parts, one kept by the seller for 10 d and the other tested by the buyer by the items and methods of this document. Where within those 10 d the buyer finds the product non-conforming and the seller objects, the part kept by the seller is sent for arbitration testing to a qualified body both parties accept. The moisture content as received is not an item of arbitration testing.

8 Transport and storage

During transport and storage the material has to be handled so as to reduce the effect of its odour on the environment.