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## Specification on Tofu Cat Litter

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## Forword

This document was drafted in accordance with the provisions of GB/T1.1-2020.

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The technical requirements of this standard shall not be lower than the mandatory national standards.

# Tofu cat litter

## 1 Limitation

This document specifies the terms and definitions, classification, requirements, test methods, inspection rules, identification, packaging, transportation, storage and shelf life of tofu cat litter.

This document is suitable for making pet litter with water absorption and deodorization functions using various bean fibers, starches, plant adhesives or edible guar gum as raw materials.

## 2 Normative reference documents

The contents of the following documents constitute indispensable clauses of this document through normative references in the text. For dated reference documents, only the dated version shall apply to the document; for undated reference documents, the latest version (including all modification lists) shall apply to the document.

GB/T 191	Packaging - Pictorial Marking for Handling of Goods
GB/T 6543	Single and Double Corrugated Boxes for Transport Packages
GB/T 6679	General Rules for Sampling Solid Chemical Products
GB/T 6682	Water for Analytical Laboratory Use - Specification and Test Methods
GB/T 10004	Plastic Laminated Films & Pouches for Packaging Dry Lamination & Extrusion Lamination
GB/T 13079	Determination of Total Arsenic in Feeds
GB/T 13080	Determination of Lead in Feeds - Method Using Atomic Absorption Spectrometry
GB/T 13091	Determination of Salmonella in Feeds
GB/T 13092	Enumeration of Molds Count in Feeds
GB/T 17480	Determination of Aflatoxin B1 in Animal Feeding Stuffs - Enzyme-linked Immunosorbent Assay
GB 18584	Indoor Decorating and Refurbishing materials-Limit of Harmful Substances of Wood Based Furniture
GB/T 23771	Determination of Bulk Density for Inorganic Chemical Products

## 3 Terms and definitions

The following terms and definitions apply to this standard.

### 3.1 Tofu cat litter

Pet litter with water absorption, agglomeration and deodorization functions using bean fibers, starches, plant adhesives or edible guar gum as raw materials. It has the characteristics of environmental protection, degradability, safety, no pollution and renewable raw materials.

### 3.2 Water absorption

It simulates the cluster property after water absorption during use of tofu cat litter. Mass ratio of 20g water absorbed by a certain weight of tofu cat litter to the consumed cat litter.

### 3.3 Collapsibility

Performance that the whole cluster of tofu cat litter is scattered into multiple small pieces when the tofu cat litter condensed into a cluster is placed in water.

## 4 Categorization

4.1 Tofu cat litter is divided into columnar tofu cat litter, spherical tofu cat litter, broken and amorphous tofu cat litter, as well as irregular tofu cat litter according to the shape.

4.2 Tofu cat litter is divided into three grades according to the quality, i.e., superior product, first class product and qualified product.

4.3 Tofu cat litter is divided into original tofu cat litter, green tea tofu cat litter, peach tofu cat litter, activated carbon tofu cat litter, lavender tofu cat litter, etc. according to its main additives or smell.

## 5 Requirements

### 5.1 Sensory requirements

Tofu cat litter products shall be free of mildew and peculiar smell.

### 5.2 Technical indicator requirements

5.2.1 See Table 1 for the technical indicator requirements of tofu cat litter.

Table 1 Technical indicators of tofu cat litter

Indicator name	Unit	Provisions		
		Superior	First-class	Qualified
Cluster property (cluster height)	cm	≤5	≤5	≤5
Water absorption	%	≥100	≥80	≥66
Cluster weight	g/20g	≤40	≤45	≤50
Cluster strength	%	≥90	≥80	≥75
Collapsibility	s	≤30	≤50	≤60
Bulk density	g/L	550±50		
Powder content	%	≤0.5	≤1	≤1.5
Powdering rate	%	≤0.5	≤0.8	≤1
Hardness	N	≥35		
Water content	%	≤12		
Ash content	%	≤20		
Deodorization effect (measured with	mg/m <sup>3</sup>	≤20		
Formaldehyde	mg/kg	≤1.5		

5.2.2 The hygienic indicators of tofu cat litter shall conform to Table 2.

Table 2 Hygienic indicators of tofu cat litter

Indicator name		Unit	Provisions	Test method
Heavy metal content	Lead	mg/kg	≤10.0	GB/T13080
	Arsenic	mg/kg	≤10.0	GB/T13079
Salmonella		-	It shall not be detected	GB/T13091
Total mildew		CFU/g	≤4×10 <sup>4</sup>	GB/T13092
Aspergillus flavus B1		ug/kg	≤20	GB/T17480

Note: CFU/g is the number of mildew per gram of product.

### 5.3 Deviation of net content

The negative deviation of the net content of a single quantitative packaging product shall comply with the provisions of Decree No.75 of the State Administration for Market Regulation, *Measures for the Supervision and Management of Quantitative Packaging Commodities*. The average net content of the same batch of products shall not be lower than the net content indicated on the label.

## 6 Test method

### 6.1 General provisions

The water shall conform to the provisions for Grade III water specified in GB/T6682-2008. The standard solution in the experiment shall be prepared in accordance with GB/T601 unless otherwise specified. The samples shall be taken randomly and tested in a standard laboratory.

Note: only the analytical reagents are used in the analysis unless otherwise specified.

### 6.2 Cluster property (cluster height)

#### 6.2.1 Method summary

The sample is condensed into a cluster when encountering water, and the longitudinal length of the condensed cluster is the cluster property.

#### 6.2.2 Instrument and equipment

25mL acid burette and 20mL standard pipette.

#### 6.2.3 Experiment steps

Take the cat litter sample, and spread it in the sample basin for about 8cm to 10cm thick. Use a pipette to draw 20mL of 1% sodium chloride solution at a temperature of 36□ to 40□, and transfer it to an acid burette. Adjust the acid burette to about 3cm away from the sample plane, open the acid burette, and the solution will flow into the sample within 30s. Take out the cluster sample 60s after flowing, measure the longitudinal length of the sample as the cluster property of the cat litter, and prepare 3 groups of samples according to the method to obtain the average value.

### 6.3 Water absorption

#### 6.3.1 Method summary

After the sample absorbs water and condenses into a cluster, measure the weight.

#### 6.3.2 Instrument and equipment

The instruments shall include:

- a) Balance, with sensitivity specification of 0.01g;
- b) Acid burette, with specification of 25mL;
- c) Pipette, with specification of 20mL.

#### 6.3.3 Analysis steps

Take the cat litter sample, and spread it in the sample basin for about 8cm to 10cm thick. Use a pipette to draw 20mL of 1% sodium chloride solution at a temperature of 36□ to 40□, and transfer it to an acid burette. Adjust the acid burette to about 3cm away from the sample plane, open the acid burette, and the solution will flow into the sample within 30s. Take out the cluster sample 60s after flowing, and weigh the mass  $m$  on a balance with sensitivity specification of 0.01g. Prepare 3 groups of samples according to the method to obtain the average value, and the formula for calculating the water absorption result is as follows:

$$X = \frac{20}{m - 20} \times 100\% \dots\dots\dots (1)$$

Where:

*X* - water absorption (%);

*m* - cluster weight, in g.

6.4 Cluster weight

See cluster weighing *m* in 6.3 for cluster weight.

6.5 Cluster strength

6.5.1 Method summary

Drop the cluster sample naturally from a certain height, and judge its cluster strength based on the breaking state.

6.5.2 Instrument and equipment

One shall ensure that the sensitivity specification of the balance is 0.01g.

6.5.3 Analysis steps

Take a cluster sample in the method of 6.2 at random, weigh the mass *m*, freely drop it from a height of 60cm onto a marble or other inelastic table top, pick up the largest piece of cat litter cluster, and weigh *m*<sub>1</sub>. The formula for calculating the cluster strength is as follows:

$$Q = \frac{m_1}{m} \times 100\% \dots\dots\dots (2)$$

Where:

*Q* - cluster strength (%);

*m*<sub>1</sub> - maximum cluster mass, in g;

*m* - cluster weight, in g.

6.6 Collapsibility

6.6.1 Method summary

Judge the collapsibility based on the scattered state of the cluster sample in water.

6.6.2 Instrument and equipment

500mL glass beaker.

6.6.3 Analysis steps

Take a cluster sample after water absorption test in 6.2 at random, place it in a beaker containing about 300mL distilled water at room temperature, and start timing. Use the sample spoon to gently stir it clockwise at 2 seconds per turn, observe whether the cluster sample collapses into multiple pieces with a diameter of less than 2cm, and record the complete collapse time.

6.7 Bulk density

6.7.1 Method summary

Weigh the mass of the sample flowing into the standard volume container through a funnel of a specific size, and calculate the result.

### 6.7.2 Instrument and equipment

Bulk density measuring device. See Figure 1 for structure dimensions (in mm).

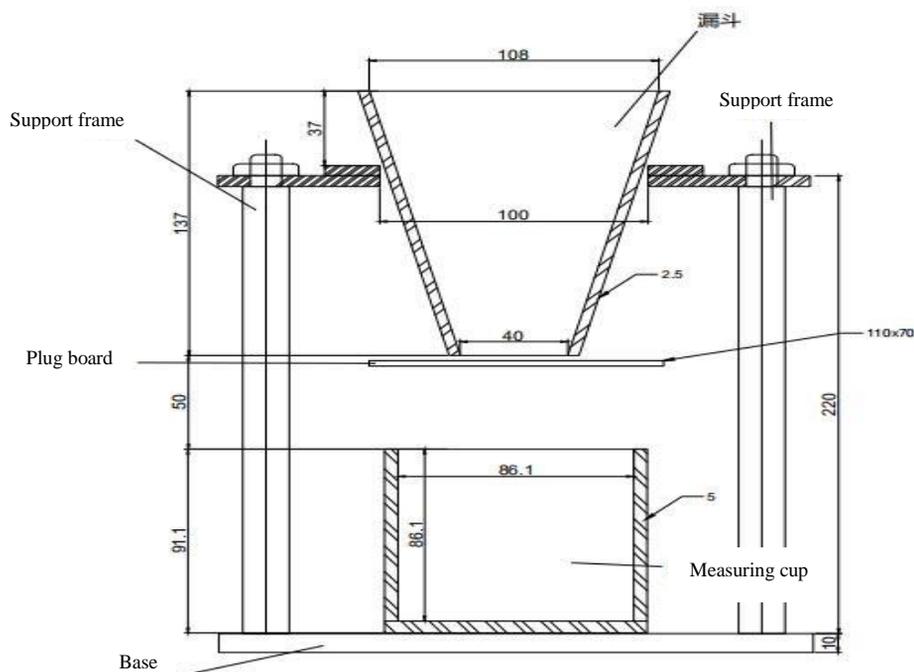


Figure 1 Bulk density measuring device

### 6.7.3 Analysis steps

Pour the sample into the funnel above the closed partition board until the sample volume is flush with the mouth of the funnel, remove the partition board, and the sample will naturally flow into the lower tank. Scrape off the one above the tank along the mouth of the cup, and weigh the sample in the tank.

### 6.7.4 Result calculation

Bulk density  $w$ , in g/L. The calculation formula is as follows:

$$w = \frac{m}{v} \times 100\% \quad \dots\dots\dots (3)$$

Where:

$m$  - value of sample mass, in g;

$v$  - value of tank volume, in ml.

## 6.8 Powder content

### 6.8.1 Method summary

Sieve a certain number of cat litter samples, and check the proportion of the 30-mesh sieve.

### 6.8.2 Instrument and equipment

The metal wire-woven mesh test sieve shall be in accordance with the series test sieves and standard sieve vibrators specified in GB/T6003.1-2012.

Note 1: The hole size of the test sieve is 30 mesh 500 $\mu$ m, and the diameter of the sieve basket is 200mm.

Note 2: The vibration frequency of the standard sieve vibrator is 1440 times/min.

### 6.8.3 Analysis steps

Extract 2.5kg (M2) finished cat litter in 5 times at random, 500g each time, pour it into a 30-mesh standard

sieve, place it in the vibrating sieve, close the sealing cover, start the vibrating sieve, vibrate for 15s, collect the powder sieved for 5 times after sieving, and measure the weight W in total.

#### 6.8.4 Result calculation

The calculation formula for the powder content is as follows.

$$F = \frac{w}{m_2} \times 100\% \quad \dots\dots\dots (4)$$

Where:

- F* - Powder content (%);
- m<sub>2</sub>* - Total weight of sample, in g;
- w* - Total weight of sieved powder, in g.

### 6.9 Powdering rate

#### 6.9.1 Method summary

The sieved cat litter sample is subject to the pulverization abrasion test in a pulverizer.

#### 6.9.2 Instrument and equipment

The metal wire-woven mesh test sieve shall refer to the series test sieves, powdering testers and standard sieve vibrators specified in GB/T6003.1-2012.

Note 1: The hole size of the test sieve is 30 mesh 500μm, and the diameter of the sieve basket is 200mm.

Note 2: The specifications of the powdering tester are: rotating speed of 50 turns/min and box dimensions of 300\*300\*125mm.

Note 3: The vibration frequency of the standard sieve vibrator is 1440 times/min.

#### 6.9.3 Analysis steps

Pour the sample of which the powder content has been measured (M3) into the differentiation apparatus in batches, rotate for 5min before shutdown, take them out respectively, pour them into the vibrating sieve to vibrate for 15s, and measure the total weight of the sieved powder W1.

#### 6.9.4 Result calculation

The calculation formula for the determination results of powdering rate h is as follows.

$$h = \frac{w_1}{m_3} \times 100\% \quad \dots\dots\dots (5)$$

Where:

- m<sub>3</sub>* - total weight of boxed sample, in g;
- w<sub>1</sub>* - total weight of sieved powder, in g.

### 6.10 Hardness

#### 6.10.1 Method summary

Select a certain length of cat litter sample, and measure it with a strength meter. The pressure head of the strength meter is 2.5cm in diameter.

Note: the measuring range is (0 to 98) N, resolution: 0.01N.

#### 6.10.2 Instrument and equipment

The strength meter shall be used for operation.

#### 6.10.3 Analysis steps

Select a cat litter with a length of 10mm to 15mm, place it in the center under the pressure head of the hardness tester with pliers, and press the start button. When the data on the hardness display is stable, record the first hardness value N1. Determine the hardness values N2...N10 of 10 pieces in this way.

#### 6.10.4 Result calculation

The calculation formula for the determination results of particle hardness is as follows:

$$N = \frac{N_1 + N_2 + \dots + N_{10}}{10} \dots\dots\dots (6)$$

Where:

$N$  - Average value of particle hardness, in N;

$N_1, N_2, \dots, N_{10}$  - Hardness of the 1st, 2nd to 10th cat litters, in N.

#### 6.11 Water content

##### 6.11.1 Baking oven method

###### 6.11.1.1 Method summary

Heat the sample to a constant mass at the specified temperature.

###### 6.11.1.2 Instrument and equipment

Electrothermal constant-temperature drying box: the temperature control accuracy can reach  $\pm 5^\circ$  in the temperature control range of  $100^\circ$  to  $180^\circ$ .

###### 6.11.1.3 Analysis steps

Use a flat weighing bottle that has been pre-baked at the specified temperature to a constant mass to weigh about 10g sample  $M$ , accurate to 0.001g, and place it in a constant-temperature drying oven controlled at  $100^\circ$  to  $110^\circ$  to dry to a constant mass  $M_1$ .

###### 6.11.1.4 Result calculation

The water content is calculated by mass fraction  $w_7$ , and the calculation formula is as follows:

$$w_7 = \frac{M - M_1}{M} \times 100\% \dots\dots\dots (7)$$

Where:

$M$  - Value of sample mass, in g;

$M_1$  - Value of sample mass after drying, in g;

##### 6.11.2 Quick water content tester method

###### 6.11.2.1 Method summary

Program-controlled temperature rise is adopted for the instrument, and the halogen lamp/infrared lamp is used to heat the sample. Continuously and automatically weigh until the mass is constant, and then report the result.

###### 6.11.2.2 Instrument and equipment

Quick water content tester: halogen/infrared lamp heating type, with sensitivity specification of 0.001g.

###### 6.11.2.3 Analysis steps

Put about 10g sample, spread it in the drying pan of the quick water content tester, and set the drying temperature at  $100^\circ$  to  $110^\circ$ . Start the determination program, and the instrument will automatically report the result when determination is ended.

#### 6.12 Ash content

It shall be determined according to the detection method specified in GB/T6438.

## 6.13 Deodorization effects

### 6.13.1 Method summary

Measure the residual ammonia concentration after a certain ammonia solution is absorbed in a closed environment.

### 6.13.2 Instrument and equipment

An ammonia gas tester shall be used.

Note: in NH<sub>3</sub> (0 to 999)ppm.

### 6.13.3 Analysis steps

Prepare an ammonia solution odor source with a concentration of 5% at a constant temperature of 23℃ to 27℃, place the sample with the bulk density together with the material cup in a square sealed sample box with a length of 30cm, a width of 20cm, and a height of 10cm or a sample box of the same volume. Place an ammonia tester at a distance of 10cm from the material cup, use a pipette to transfer 20mL of the prepared odor source to flow to the center point of the material cup, start to seal the sample box, and read the value after 3min, which is the deodorization effect.

## 6.14 Formaldehyde detection

### 6.14.1 Method summary

Absorb and measure the volatilized formaldehyde gas in an enclosed space.

### 6.14.2 Instrument and equipment

Spectrophotometer and glass dryer.

### 6.14.3 Analysis steps

Place a crystallization dish with a diameter of 120mm and a height of 60mm at the bottom of the dryer with a diameter of 240mm and a volume of 11L, add 300mL of distilled water into the crystallization dish, and place 500g of tofu cat litter at the upper part of the dryer with a metal tray. Place the measuring device at 23℃ to 27℃ for 24h, use the distilled water absorption solution as the solution to be tested, and carry out determination according to GB18584.

## 6.15 Heavy metal content

The heavy metal lead content is determined according to GB/T13080, and the arsenic content is determined according to GB/T13079.

## 6.16 Allowable error of net content

It shall be implemented according to the provisions of JJF1070

## 7 Inspection rules

### 7.1 Inspection category and items

Product inspection includes factory inspection and type inspection.

#### 7.1.1 Factory inspection

7.1.1.1 The product shall be inspected by the Quality Inspection Department of the manufacturer before leaving the factory. The product can leave the factory after passing inspection and being attached with a conformity certificate.

7.1.1.2 The factory inspection items are: sensory requirements, water absorption, net content, water content, cluster weight, collapsibility and powder content.

## 7.1.2 Type inspection

Type inspection items are all requirements stipulated in this standard. During normal production, it shall be carried out once a year. Type inspection shall be carried out in one of the following situations:

- a) During trial production appraisal of new products;
- b) When production resumes 3 months after production stop;
- c) When there are major changes in the raw material source, process or design, which may affect the product quality;
- d) When there is a big difference between the factory inspection and the last type inspection;
- e) When the national quality supervision institution or management department proposes any requirement.

## 7.2 Batch and sampling

### 7.2.1 Batch

The products of the same level which are continuously manufactured with the same material and at the production conditions basically the same or manufactured by the same team belong to a batch.

### 7.2.2 Sampling scheme

#### 7.2.2.1 Bagged products

See the batch inspection and sampling plan in the retrieval of GB/T2828.1 for bagged products.

#### 7.2.2.2 Bulk products

The sampling scheme for bulk products shall be prepared in accordance with the provisions of GB/T6679.

## 7.3 Sample division and sample preparation

### 7.3.1 Sample division

Quickly mix the collected samples, use a divider or the quartering method to divide the sample to about 1kg, then divide into two parts, put them into two clean and dry 500mL glass bottles or plastic bottles with ground stoppers or clean and dry plastic zip-lock bags. Seal and affix a label, indicating the manufacturer name, product name, batch number or date of manufacture, sampling date and the name of the person taking the sample. One bottle shall be used for product quality analysis, and the other bottle shall be stored for three months for future reference.

## 7.4 Judgment rules

The judgment rules for the inspection items are as follows:

- a) When all inspection items are qualified, it is judged as qualified;
- b) When no more than two indicators are unqualified, double sampling is allowed to re-inspect the unqualified items. If the re-inspection result is qualified, it shall be judged as qualified. Otherwise, it will be judged as unqualified, and the batch of products will be unqualified;
- c) When there is a dispute between the supply and demanding parties about the product quality, both parties may consult the statutory quality inspection department to conduct arbitration inspection in accordance with the test methods and inspection rules specified in this standard.

## 8 Identification, packaging, transportation, storage and shelf life

### 8.1 Identification

8.1.1 The product packaging shall include at least but not limited to the following contents:

- a) Product name;
- b) Name and address of production unit;
- c) Product net weight;
- d) Date of manufacture and shelf life;

- e) Executive standard number;
- f) Product conformity identification.

8.1.2 The pictorial signs for packaging, storage and transportation on the packaging box shall be used in accordance with the provisions of GB/T191.

8.1.3 The signs shall be clear and firm, and shall not fade, change color or fall off due to transportation conditions and natural conditions.

## 8.2 Packaging

8.2.1 The plastic bags (cans) that conform to the provisions of GB/T10004 shall be adopted for the inner packaging material of the product.

8.2.2 The outer package of the product shall be clean, non-toxic and free of peculiar smell. The corrugated paper boxes conforming to provisions of GB/T6543 can be adopted.

## 8.3 Transportation

During transportation, pollution shall be prevented, and solarization, rain and moisture shall be avoided. The means of transportation shall be clean and odor-free, and shall not be mixed with toxic, harmful, odorous, volatile and corrosive items.

## 8.4 Storage

It shall be stored in a well-ventilated, cool, clean and dry warehouse, free from light, insect pests and rodents. The distance from the wall and the ground shall be more than 100mm, and it shall not be mixed with toxic, harmful, odorous, volatile and corrosive items.

## 8.5 Shelf life

The manufacturer shall determine it according to its own process under the specified transportation and storage conditions and when the package is complete and unsealed.