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

GB 31635-2014

National Food Safety Standard -- Food Additives -- Polystyrene

食品安全国家标准 食品添加剂 聚苯乙烯

(English Translation)

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1 Scope

This standard applies to food additives polystyrene polymerization of a styrene monomer was synthesized.

2.1 Chemical Name

Polystyrene.

2.2 Structure

Formula 2.3

3.1 Sensory requirements

Shall comply with the requirements in Table 1.

Table 1 Sensory requirements

Project requires test methods Color status odor Colorless, transparent and shiny Powders or granules Tasteless Proper amount of sample is placed in a clean, dry porcelain dish, under natural light, Views Police state and its color, and smell the scent

3.2 Physical and Chemical Indicators

Shall be in accordance with Table 2.

Table 2. Physical and chemical indicators

Item Index Test Method Styrene/(mg/kg) ≤ 500 GB/T 5009.59 Ethylbenzene/(mg/kg) ≤ 500 GB/T 5009.59 Toluene, n-propylbenzene, cumene, ethylbenzene, styrene total/(mg/kg) ≤ 5000 GB/T 5009.59 Volatile organic compounds (w) /% ≤ 0.5 Appendix A A.4 Total

migration (w) /% ≤ 4.0 A.5 Lead (Pb)/(mg/kg) ≤ 2.0 GB 5009.12 A.6 peroxide value not detected Appendix A Testing method A.1 Warning Reagents of this standard test method for use in corrosive or toxic, the operation should take appropriate safety measures and protection.

A.2 General Provisions this standard reagent in the absence of water and other requirements stated, refer to three analytical reagent and water 6682 in a predetermined GB/T . test Test used in the standard solution, the standard solution, the determination of impurities, products and preparations, in the absence of other requirements specified, are by GB/T 601, GB/T 602, a predetermined preparation GB/T 603 a. The test does not indicate when the solution which is formulated with a solvent, refer to the aqueous solution.

A.3 Identification Test A small sample was taken in the combustion spoon, spoon placed in the combustion flame burning alcohol lamp. Combustible sample, orange yellow flame, the fire away from the sample Flame, the sample continued to burn, yellow-orange flame and black smoke, sample blistering, softening, a small amount of turpentine, the flame is extinguished after the combustion Burning the sample in the spoon can pull the growth of a transparent long filaments.

Determination of volatile organic compounds A.4 A.4.1 Method summary After drying the sample, dried at 90 deg.] C 24h is the loss in mass of volatile organic substances.

A.4.2 Reagents and materials Liquid nitrogen.

A.4.3 Instruments and Equipment Mills. 48 μ m with a titanium mesh.

A.4.4 Analysis step

A.4.4.1 Preparation of sample Particle sample is placed frozen in liquid nitrogen for several minutes, remove the ground with mills, through 74 μ m and 37 μ m standard sieve scale taken through 74 μ m Quasi alternate sample remaining on the sieve 37 μ m standard sieve.

Particle size less than 74 μ m by 74 μ m and 37 μ m powder sample standard sieve, taking 74 μ m through 37 μ m sieve to remain in standard sieve on alternate samples.

A.4.4.2 Determination Weigh about 10g sample, the sample is spread on a glass petri dish constant mass (M0) and placed in a desiccator containing anhydrous calcium chloride, put Set 48h, weighed (m1, to the nearest 0.1mg). Glass bottle weighed into an oven dish, 24h is placed in a constant temperature takes 90 °C $\pm$ 5 °C Out, the weighing bottle filled with anhydrous calcium chloride was placed in a vacuum desiccator, weighed and the glass petri dish removed (M2, the nearest 2h 0.1 mg), returned to the oven 90 °C $\pm$ 5 °C constant temperature 2h, filled with anhydrous calcium chloride into a vacuum desiccator weighed after 2h until two the difference is a constant weight parts per million or less.

A.4.5 calculation results W1 mass fraction of volatile organic compounds according to formula (A.1) is calculated.

$m_1 - m_2$

$m_1 - m_0 \times$

100% (A.1)

Where.

After constant weight M_1 --- dryer-mass of the specimen with a glass petri dish in grams (G);

--- M_2 by mass of the sample after a constant weight in an oven and the glass petri dish in grams (G);

--- mass M_0 glass Petri dish in grams (g).

In parallel arithmetic mean of test results of the measurement result prevail (calculated to two significant digits), obtained under repeatability conditions the absolute difference between two independent determination results shall not exceed 30% of the arithmetic mean.

A.5 Determination of the overall migration A.5.1 Method summary After the measurement sample is soaked in 10% ethanol solution was evaporated non-volatile residue, i.e. total migration.

A.5.2 Reagents and materials Ethanol solution. 10% (volume fraction).

A.5.3 Instruments and Equipment A.5.3.1 oven thermostat.

A.5.3.2 temperature oscillator.

A.5.4 Analysis step

A.5.4.1 Preparation of Sample. prepared according A.4.4.1.

A.5.4.2 Preparation of test solution. 0.375g Weigh sample in iodine flask, 500mL of ethanol was added, the bottle placed in a thermostatic shaking iodine Vessel, $5^\circ\text{C} \pm 1^\circ\text{C}$ temperature oscillation 1h, removed by filtration through 0.2 μm membranes aqueous or centrifugation, the filtrate was collected as a test solution.

A.5.4.3 Determination. Pipette to a test liquid 200mL clean beaker, previously divided into at $100^\circ\text{C} \pm 5^\circ\text{C}$ dried to constant weight 50mL glass evaporating dish, a small amount of ethanol as eluent beaker, combined washings were evaporated to above 50mL glass dish, evaporated in a water bath Sent to 2mL ~ 3mL, placed in drying oven $100 \pm 5^\circ\text{C}$ dried deg.] C 2h. After 30min removed weighed cooled in a desiccator, put Back into the drying oven dried $100^\circ\text{C} \pm 5^\circ\text{C}$ 1h, cooled after 30min into a dryer weighed until a constant weight, the recording quality.

Two parallel experiments performed, along with a blank test specimens.

A.5.4.4 Calculation Results. mass fraction of the total amount of migration w_2 calculated according to formula (A.2).

$$\frac{m_2 - m_1 - m_0}{0.375 \times 200 \times 100\%}$$

Where.

--- M_2 by the constant weight (50 mL glass boat soaking liquor was evaporated to dryness after migration) mass in grams (G);

--- M_1 was constant weight (50 mL glass boat) mass in grams (G);

M_0 --- blank test 10% ethanol was evaporated to dryness after migration mass in grams (G);

--- 0.375 mass of the sample in grams (G);

500 --- soaking solution volume in milliliters (mL);

--- test fluid volume 200 is in milliliters (mL).

In parallel arithmetic mean of test results of the measurement result prevail (calculated to two significant digits), obtained under repeatability conditions the absolute difference between two measurement results shall not exceed 20% of the arithmetic mean.

Determination of peroxide value through A.6 A.6.1 Method summary Peroxide in mineral oil remaining in the polystyrene produced during oxidation, and potassium iodide, to generate free iodine, the starch color.

A.6.2 Reagents and materials A.6.2.1 potassium iodide solution. Weigh 2g of potassium iodide solid was dissolved in 10mL water.

A.6.2.2 starch indicator. Weigh 0.5g of starch, amount of 100mL of water, the first with a small amount of water into a paste of starch, water power take 90mL the furnace was heated to a boil, poured into starch paste, then the beaker was rinsed several times with the remaining water, wash poured into a beaker, boiling 3min.

A.6.3 Analysis step

A.6.3.1 Preparation of sample Prepared according to A.4.4.1.

A.6.3.2 Preparation of test solution Weigh 5.0g sample was placed in 250mL iodometric flask, 150mL of chloroform, iodine bottle wrapped with aluminum foil and extracted shocks for 16 h, the end of the extraction, filtration, the filtrate was collected in another flask iodine, flask with aluminum foil wrapped in paper, to the filtrate nitrogen 15min.

A.6.3.3 Determination to sample solution was added 1mL potassium iodide solution, tightly