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

GB/T 28112-2026

Replacing GB/T 28112-2011

**Determination of residual volatile methyl cyclosiloxane and
methyl vinyl cyclosiloxane content in silicone rubber**

硅橡胶中残留挥发性甲基环硅氧烷和甲基乙烯基环硅氧烷含量的测定

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Foreword

This document was issued on 30 July 2026 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 February 2027.

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

It is classified under ICS 83.060 and Chinese classification G 35.

The document runs to 15 pages. The identification, the dates, the classification and the table of contents on this page are taken from the cover and the printed contents of the standard itself.

This document was drafted in accordance with GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

This document replaces GB/T 28112-2011 "Determination of residual volatile methyl cyclosiloxane in silicone rubber". Compared with the 2011 edition, apart from structural adjustments and editorial changes, the main technical changes are as follows:

- a) the scope has been changed, and the determination of hexamethylcyclotrisiloxane and of methyl vinyl cyclosiloxane has been added (see Clause 1; Clause 1 of the 2011 edition);
- b) the minimum limit of detection for the single components has been changed (see Clause 1; Clause 1 of the 2011 edition);

- c) the summary of the method has been changed (see Clause 4; Clause 3 of the 2011 edition);
- d) n-tetradecane and anhydrous sodium sulfate have been deleted (see 5.1 and 5.4 of the 2011 edition);
- e) hexamethylcyclsiloxane and methyl vinyl cyclsiloxane standards have been added (see 5.3 and 5.10 to 5.12);
- f) the provisions on the standards have been changed (see 5.4 to 5.9; 5.2 and 5.5 of the 2011 edition);
- g) the method of preparing the internal standard stock solution and the mixed standard solution has been changed (see 5.16 to 5.19; 5.9 and 5.10 of the 2011 edition);
- h) the provisions on the gas chromatograph-mass spectrometer (GC-MS) have been deleted (see 4.1, 8.1.2 and Figure A.2 of the 2011 edition);
- i) the provisions on the capillary column have been changed (see 6.2; 4.2 of the 2011 edition);
- j) the ultrasonic cleaner and the conical flask have been deleted (see 4.5 and 4.8 of the 2011 edition);
- k) the specifications of the microsyringe and the pipette have been changed (see 6.5 and 6.9; 4.6 and 4.7 of the 2011 edition);
- l) a centrifuge, a shaker and sample vials have been added (see 6.6, 6.7 and 6.8);
- m) the method of preparing the test sample has been changed (see 7.2; 6.2 of the 2011 edition);
- n) the gas chromatographic conditions have been changed (see Table 1; Clause 7 of the 2011 edition);
- o) the analytical procedure has been changed (see Clause 9; Clause 8 of the 2011 edition);
- p) the calculation formula and the number of digits retained in the result have been changed (see Clause 10; Clause 9 of the 2011 edition).

Attention is drawn to the possibility that some elements of this document may be the subject of patent rights. The issuing body assumes no responsibility for identifying them.

A warning appears at the head of the document: persons using it should have practical experience of proper laboratory work. The document does not identify all possible safety issues, and it is the user's responsibility to take appropriate safety and health measures and to comply with the relevant national regulations.

A note follows it: some of the procedures in this document may involve the use or generation of substances harmful to the local environment, or may produce waste, which

after use shall be handled and disposed of safely in accordance with the relevant documents.

1 Scope

GB/T 28112 is the Chinese method for measuring the volatile cyclosiloxanes left in silicone rubber after cure. D4, D5 and D6 are the residues in question, and they are under regulatory pressure worldwide because they are persistent and bioaccumulative; in China they matter for any silicone article that touches food or skin, and for the emissions of a silicone plant. The 2026 edition widens the method beyond the methyl cyclosiloxanes of the 2011 edition to cover hexamethylcyclotrisiloxane and the methyl vinyl cyclosiloxanes as well, and it changes the limit of detection for the single components. The document names the ten components it covers, D3 to D9 and the vinyl cyclosiloxanes D3Vi3, D4Vi4 and D5Vi5, and fixes the minimum limit of detection for a single component at 5 mg/kg. The determination is by gas chromatography with an internal standard, and the document covers the principle, the reagents and materials, the instruments and equipment, the preparation of the test sample, the chromatographic conditions, the analytical procedure and the calculation of results. For a silicone rubber producer or a buyer of silicone parts, this is the method a Chinese specification cites.

2 Normative references

The contents of the following documents constitute indispensable provisions of this document through normative reference in the text. For dated references, only the edition corresponding to that date applies. For undated references, the latest edition, including all amendments, applies.

GB/T 8170 Rules of rounding off for numerical values and expression and judgement of limiting values.

GB/T 15340 Natural and synthetic rubbers - Sampling and further preparative procedures.

3 Terms and definitions

This document contains no terms and definitions requiring definition.

4 Principle

A measured quantity of solvent is added to the sample and the sample is extracted by shaking. After centrifuging, the supernatant is taken and separated on a capillary column, and the components are detected with a gas chromatograph fitted with a flame ionisation detector. n-Dodecane is used as the internal standard, and the content of each component determined is corrected and quantified by the internal standard method.

5 Reagents and materials

5.1 Acetone, analytical grade.

5.2 to 5.12 The standards: n-dodecane ($C_{12}H_{26}$) of purity not less than 99 % by mass, and the cyclosiloxane standards, that is hexamethylcyclotrisiloxane (D3), octamethylcyclotetrasiloxane (D4), decamethylcyclopentasiloxane (D5), dodecamethylcyclohexasiloxane (D6), tetradecamethylcycloheptasiloxane (D7), hexadecamethylcyclooctasiloxane (D8) and octadecamethylcyclononasiloxane (D9), each of purity not less than 99 % by mass, together with trimethyltrivinylcyclotrisiloxane (D3Vi3) of purity not less than 97 % and tetramethyltetravinylcyclotetrasiloxane (D4Vi4) and pentamethylpentavinylcyclopentasiloxane (D5Vi5) of purity not less than 99 %. Information on the reagents used is given in Annex A.

5.13 to 5.15 The gases: nitrogen and hydrogen of purity not less than 99.999 % by volume, and dry air.

5.16 Internal standard stock solution, about 3000 mg/kg: weigh 0.1 g of n-dodecane to the nearest 0.1 mg into a 50 mL sample vial, add 33.0 g plus or minus 0.5 g of acetone weighed to the nearest 0.1 mg, close and shake to mix. The stock solution is sealed and kept at 4 degrees Celsius plus or minus 2 degrees.