



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

GB/T 19941.3-2019

**Leather and fur -- Determination of formaldehyde content -- Part
3: Formaldehyde emissions**

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Foreword

GB/T 19941 "Leather and fur - Determination of formaldehyde content" consists of the following 3 parts:

- Part 1: High performance liquid chromatography method;
- Part 2: Colorimetric method;
- Part 3: Formaldehyde emissions.

This Part is Part 3 of GB/T 19941.

This Part was drafted in accordance with the rules given in GB/T 1.1-2009.

This Part uses redrafting method by adopting ISO 17226-3:2011 "Leather - Chemical determination of formaldehyde content - Part 3: Determination of formaldehyde emissions from leather".

Compared with ISO 17226-3:2011, this Part has more structural adjustments.

Annex A gives a list of comparisons between this Part and I ISO 17226-3:2011 on chapter numbers.

Compared with ISO 17226-3:2011, there are technical differences in this Part.

Annex B gives a list of corresponding technical differences and their reasons.

This Part also made the following editorial modifications:

- changed the standard name to "Leather and fur - Determination of formaldehyde content - Part 3: Formaldehyde emissions";
- added a note on operation when the formaldehyde content is too high in 6.3;
- modified formula symbol.

This Part was proposed by China National Light Industry Council.

This Part shall be under the jurisdiction of National Technical Committee on Leather Industry of Standardization Administration of China (SAC/TC 252).

The drafting organizations of this Part: Chongqing Testing and Certification (Group) Co., Ltd., National Leather Quality Supervision and Inspection Center (Zhejiang), Foshan Nanhai District Jinda Footwear Company Limited, Test Instruments (Fujian) Co., Ltd., China Leather and Footwear Research Institute Co., Ltd., Dongguan Huikeda Footwear Company Limited.

Leather and fur - Determination of formaldehyde
content - Part 3: Formaldehyde emissions

1 Scope

This Part of GB/T 19941 specifies high performance liquid chromatography (HPLC) method for the determination of formaldehyde emission in leather and fur.

This Part is applicable to determination of formaldehyde emission in various leathers, furs and their products.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 6682, Water for analytical laboratory use - Specification and test methods (GB/T 6682-2008, ISO 3696:1987, MOD)

QB/T 1266, Leather - Physical and mechanical tests - Sample preparation and conditioning (QB/T 1266-2012, ISO 2419:2006, MOD)

QB/T 1267, Fur - Chemical, physical and mechanical and fastness tests - Sampling location (QB/T 1267-2012, ISO 2418:2002, MOD)

QB/T 1273, Fur - Chemical Tests - Determination of Volatile Matter (QB/T 1273-2012, ISO 4684:2005, MOD)

QB/T 2706, Leather - Chemical physical and mechanical and fastness tests - Sampling location (QB/T 2706-2005, ISO 2418:2002, MOD)

QB/T 2707, Leather - Physical and mechanical tests - Sample preparation and conditioning (QB/T 2707-2018, ISO 2419:2012, MOD)

QB/T 2717, Leather - Chemical tests - Determination of volatile (QB/T 2717-2018, ISO 4684:2005, MOD)

Use the die knife (5.8) to cut 5 samples with a size of 100mmx40mm. In order to fix the sample, at 10mm from the edge of each sample, make a hole with a diameter of 3mm~4mm.

6.1.3 Sample storage

To avoid cross-contamination and formaldehyde loss during transportation and storage, leather and fur samples shall be transported in inert plastic sealed bags.

NOTE: It is recommended to use multi-layer polyethylene plastic bags with metal inner films.

6.2 Absorption of released formaldehyde

Weigh 5 samples, to the nearest of 0.01g. Respectively place on the hooks in

5 sample bottles (5.1) containing 50mL of water. Seal. Take another sealed

sample bottle that contains only 50mL of water as a blank. After each sample bottle is sealed, immediately put into a (60+/-2)°C oven. Place for (180+/-15) min. Cool the sample bottle at room temperature for 1h. Take out the sample. The

aqueous solution that contains formaldehyde is immediately tested in accordance with 6.3.

6.3 Reaction with dinitrophenylhydrazine to develop color

Transfer 4.0mL of acetonitrile (4.3), 5.0mL of aqueous formaldehyde solution (6.2) and 0.5mL of 2,4-dinitrophenylhydrazine solution (4.2) into a 10mL volumetric flask. Use distilled water to dilute to the scale. Shake well and place for 60min~180min. After filtering through a filter membrane (5.10), perform chromatographic determination.

NOTE: When the formaldehyde content is high ($>100\text{mg/kg}$), it may reduce the amount of filtrate pipetted. When the pipetted filtrate is less than 5mL, use distilled water to make up to 5mL (for dilution).

6.4 Chromatographic (HPLC) conditions (recommended)

It shall confirm the reliability of the HPLC test system daily. Follow the steps specified by the standard curve (6.5) to determine a standard solution with formaldehyde mass concentration of 2mg/L. Verify the reliability of the method by recovery rate.

The following chromatographic conditions are recommended chromatographic conditions:

Flow rate 1.0mL/min

Mobile phase Acetonitrile: water=60:40

Separation column C18 reverse phase column + pretreatment column (1cmPR18)

D - Dilution factor, which is 1 under standard specified conditions; only when the formaldehyde content in the sample exceeds the detection range of the standard working curve, it needs to be diluted;

m - Sample mass, in grams (g).

The detection limit of this method is 5.0mg/kg.

If the test result is based on the absolute dry state, the test result shall be multiplied by the conversion factor $100/(100-w)$. w is the volatile content (%),