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

GB/T 42164-2022

**Leather - Chemical tests - Thermal ageing of leather and
determination of hexavalent chromium**

皮革 化学试验 热老化条件下六价铬含量的测定

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Foreword

This document was issued on 30 December 2022 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 July 2023.

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

1 Scope

GB/T 42164-2022 covers the determination of hexavalent chromium in leather after the leather has been deliberately aged by heat, rather than in leather as it reaches the laboratory. The principle is short: the sample is heated in an oven for a specified time, cooled, and then measured for hexavalent chromium by spectrophotometry or chromatography. The instruments clause carries the conditions of the oven, because the ageing step is only reproducible if the oven is. The static oven has to control temperature to plus or minus 2 °C, and must have no blower or other air circulation system and no openings for air exchange. Sampling follows GB/T 39364, with provision for leather that cannot be taken from the standard locations because it is already made up into shoes or clothing. The test procedure begins by preheating the oven to the temperature given in the

standard's table, and a reporting clause closes the method. Three informative appendices carry the structural comparison with ISO 10195:2018, the formation of hexavalent chromium under natural ageing conditions, and interlaboratory accuracy results. Tanneries, leather goods and footwear brands, and the testing laboratories checking chromium-tanned stock against restricted substance lists are the readers.

This document describes a method for the determination of the hexavalent chromium content of leather under thermal ageing conditions.

This document is applicable to the determination of hexavalent chromium content in various types of chrome-tanned leather under thermal ageing conditions.

2 Normative references

The following documents contain the provisions which, through normative reference in this document, constitute the essential provisions of this document. For the dated referenced documents, only the versions with the indicated dates are applicable to this document; for the undated referenced documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 22807 Leather and fur - Chemical tests - Determination of chromium (VI)

content: Colorimetric method (GB/T 22807-2019, ISO 17075-1:2017, MOD)

GB/T 38402 Leather and fur - Chemical tests - Determination of chromium (VI)

content: Chromatographic method (GB/T 38402-2019, ISO 17075-2:2017, MOD)

GB/T 39364 Leather - Chemical, physical, mechanical and fastness tests -

Sampling location (GB/T 39364-2020, ISO 2418:2017, MOD)

QB/T 2716 Leather - Preparation of chemical test samples (QB/T 2716-2018, ISO

4044:2008, MOD)

3 Terms and definitions

There are no terms and definitions that need to be defined in this document.

4 Principles

The leather sample is heated in an oven for a specified time, and then the hexavalent chromium content in the sample is measured by spectrophotometry or chromatography

after cooling.

5 Instruments and equipment

5.1 Static oven: The temperature required for the test can be controlled, and the temperature control accuracy is $\pm 2\text{ }^{\circ}\text{C}$. The oven shall not have a blower or other air circulation system, nor shall it have openings for air exchange, and the interior of the oven shall be made of inert materials. A natural convection oven should be used.

5.2 Erlenmeyer flask with a stopper: 250 mL; it is used to contain the sample and can be kept at $80\text{ }^{\circ}\text{C}$ for 24 h and cooled at room temperature. The Erlenmeyer flask meets the requirements for determining the content of hexavalent chromium according to the provisions of GB/T 22807 or GB/T 38402.

5.3 Temperature and humidity measuring instrument: The allowable error of the temperature indication is not more than $\pm 1\text{ }^{\circ}\text{C}$, and the indication error of the relative humidity is not more than $\pm 5\%$.

5.4 Analytical balance: The accuracy is 0.1 mg.

6 Sampling and sample preparation

6.1 Sampling

The sampling shall be carried out according to the provisions of GB/T 39364. If it is not possible to take samples at standard locations (such as leather on shoes and clothing), take samples at any location within the usable area. The samples shall be representative and shall be noted in the test report.

6.2 Sample preparation

Sample preparation shall be carried out according to the provisions of QB/T 2716, and the sample is cut into 3 mm~5 mm sheets.

7 Test procedures

7.1 Preheat the oven (5.1) to the specified temperature, see Table 1.

Appendix C

(Informative)

Accuracy

The test results among multiple laboratories in June 2016 are as follows:

This interlaboratory trial was to compare the effect of two ageing methods (thermal and light) on the hexavalent chromium content in leather.

A total of 7 laboratories and 5 chrome-tanned leather samples were involved in the study.

- a) Sample A: bovine crust leather without finishing; the technology for reducing the hexavalent chromium content was used in its production process, including the use of reducing agents.
- b) Sample B: bovine crust leather without finishing; the technology for reducing the hexavalent chromium content was used in its production process, but no reducing agents were used.
- c) Sample C: black finished leather.
- d) Sample D: bovine crust leather, no technology to reduce the hexavalent chromium content was used in its production process, but the vegetable tanning agent was used.
- e) Sample E: bovine crust leather, no technology to reduce the hexavalent chromium content was used in its production process.

Samples were distributed to different laboratories during the same week in 2016 (Week 29).

The test of hexavalent chromium content was carried out according to ISO 17075-2 (chromatographic method).

The test results of thermal ageing treatment are shown in Table C.1.

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