



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

GB/T 38409-2019

**Leather - Chemical tests - Determination of
N-methyl-2-pyrrolidone (NMP) and N-ethyl-2-pyrrolidone (NEP)
content**

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Foreword

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

This standard uses the redrafting method to modify and adopt ISO 19070:2016

"Leather - Chemical determination of N-methyl-2-pyrrolidone (NMP) in leather".

Compared with ISO 19070:2016, this standard has many adjustments in structure. Appendix A gives a list of comparisons of clause numbers between this standard and ISO 19070:2016.

Compared with ISO 19070:2016, this standard has made the following technical modifications:

- Regarding normative references, this standard has adjusted the technical differences; the adjustments are collectively reflected in Chapter 2

"Normative references". The specific adjustments are as follows:

* ADD the reference to GB/T 6682;

* USE the QB/T 2716 which modifies and adopts international standard to replace ISO 4044;

* DELETE the ISO 2418.

- ADJUST the expression of "3 Principles" in ISO 19070:2016, which is more

in line with China's habits.

- ADJUST the "5.4 Micropipette" in ISO 19070:2016 to "5.4 Appropriate Pipette", for easy operation.
- ADJUST and MODIFY the "6.1.1 NMP standard stock solution" in ISO 19070:2016 to "4.5 NMP and NEP mixed standard stock solution (1000 µg/mL)". At the same time, ADD the storage requirements and validity period of the stock solution, for easy understanding and use.
- In "6.1 Drawing the standard working curve", ADD the standard solution, which has a concentration of 0.5 µg/mL, to make the concentration range covered by the standard curve more reasonable.
- In ISO 19070:2016 "6.3 Extraction procedure", DELETE the repeated provision that "the test of filtrate shall be finished within 24 hours", MODIFY the extraction time from "(1.0 +/- 0.1) h" to "(60 +/- 2) min"; MODIFY the refrigerator's temperature from "(4 +/- 2) °C" to "0 °C ~ 4 °C", which is consistent with similar standards in China.
- ADJUST the "Appendix A Chromatographic analysis" in ISO 19070:2016
Leather - Chemical tests - Determination of N-methyl-2-pyrrolidone (NMP) and N-ethyl-2-pyrrolidone (NEP)
content

1 Scope

This standard specifies the determination method of N-methyl-2-pyrrolidone (NMP) and N-ethyl-2-pyrrolidone (NEP) content in leather and its products.

This standard is applicable to the determination of NMP and NEP in various leather and its products.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including

all the amendments) are applicable to this standard.

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

QB/T 2716 Leather - Preparation of chemical test samples (QB/T 2716-2018, ISO 4044:2008, MOD)

3 Principles

Under specified conditions, the sample is ultrasonically extracted by acetone. The obtained extract is analyzed by gas chromatography-mass spectrometry (GC-MS); it is quantified by external standard method.

4.1 General requirements: Unless otherwise specified, all reagents used are of analytical grade; the test water shall meet the requirements of Grade 3 water in GB/T 6682.

4.2 Acetone, chromatographically pure.

then increase to 300 °C at 30 °C/min; hold for 1 min.

6.4.2 Mass spectrometry conditions

Ionization method: EI.

Ionization energy: 70 eV.

Detection method (SIM/SCAN mode): SIM: $m/z = 99$ (NMP), $m/z = 98$ (NEP).

Ion source's temperature: 230 °C.

Temperature at interface of chromatography-mass spectrometry: 280 °C.

Solvent delay: 2.5 min.

7 Calculation and presentation of results

According to formula (1), calculate the content of NMP and NEP in the specimen:

Where:

w - The content of NMP or NEP in the specimen, in milligrams per kilogram

(mg/kg), (accurate to 0.1 mg/kg);

$\rho_{\text{H}_2\text{O}}$ - The mass concentration of NMP or NEP, which is read from the standard curve, in micrograms per milliliter ($\mu\text{g/mL}$);

V - Extraction volume ($V = 10 \text{ mL}$ under standard conditions), in milliliter (mL);

m - The mass of the specimen, in grams (g).

The detection limit of this method is 5 mg/kg.

8 Test report

The test report shall include the following:

- a) Number of this standard;
- b) The name, number, type, manufacturer (or trademark) of specimen;
- c) The content of NMP and NEP as extracted from the specimen, mg/kg;

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