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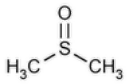
Dimethyl Sulfoxide



C_2H_6OS 78.13
Methane, sulfinylbis-;
Methyl sulfoxide CAS RN®: 67-68-5; UNII: YOW8V9698H.

DEFINITION
Dimethyl Sulfoxide contains NLT 99.9% of dimethyl sulfoxide (C_2H_6OS), calculated on the anhydrous basis.

IDENTIFICATION
Change to read:

• **A. Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*:** ▲197A or▲ (USP 1-Dec-2024) 197F. Potassium bromide plates are used for 197F.

Change to read:

• **B.** ▲The retention time of the major peak of the *Sensitivity solution* corresponds to that of the major peak of the *Sample solution*, as obtained under the test for *Organic Impurities*.▲ (USP 1-Dec-2024)

ASSAY
Change to read:

• **Procedure**

Analysis: Using the results from the tests for *Limit of Nonvolatile Residue* and *Organic Impurities*, calculate the percentage of dimethyl sulfoxide (C_2H_6OS) in the portion of Dimethyl Sulfoxide taken:

$$\text{Result} = 100 - I$$

I = sum of the percentage of nonvolatile residue as determined in the *Limit of Nonvolatile Residue* test and the percentage of total impurities as determined in the *Organic Impurities* test

▲▲ (USP 1-Dec-2024)

Acceptance criteria: NLT 99.9% on the anhydrous basis

IMPURITIES
Change to read:

• **Organic Impurities**

▲**Diluent:** Methanol

System suitability solution: 1 mg/mL of USP Dimethyl Sulfoxide RS and 10 µg/mL of USP Methylsulfonylmethane RS in *Diluent*

Sensitivity solution: 30 µg/mL of USP Dimethyl Sulfoxide RS in *Diluent*

Sample solution: 100 mg/mL of Dimethyl Sulfoxide in *Diluent*

Chromatographic system

(See *Chromatography ⟨621⟩, System Suitability*.)

Mode: GC

Detector: Flame ionization

Column: 0.53-mm × 30-m capillary column coated with a 3-µm film of phase G43

Temperatures

Injection port: 250°

Detector: 250°

Column: See *Table 1*.

Table 1

Initial	Temperature	Final	Hold Time at Final

Temperature	Ramp (°/min)	Temperature (°)	Temperature (min)
Carrier gas: Hydrogen Flow rate: 5 mL/min			
Injection volume: 0.5 µL Injection type: Split, split ratio 10:1	0	100	2
System suitability	10	200	3

Samples: *System suitability solution* and *Sensitivity solution*

[NOTE—The relative retention times for dimethyl sulfoxide and methylsulfonylmethane are 1.0 and 1.6, respectively. These relative retention times are provided as information that could aid in peak assignment.]

Suitability requirements

Resolution: NLT 4.0 between dimethyl sulfoxide and methylsulfonylmethane, *System suitability solution*

Relative standard deviation: NMT 5.0%, *Sensitivity solution*

Signal-to-noise ratio: NLT 10, *Sensitivity solution*

Analysis

Sample: *Sample solution*

Calculate the percentage of total impurities in the portion of Dimethyl Sulfoxide taken:

$$\text{Result} = (r_U/r_T) \times 100$$

r_U = sum of the areas of all the impurity peaks in the *Sample solution*

r_T = sum of the areas of all peaks in the *Sample solution*

Acceptance criteria: The reporting threshold is 0.03%.

Total impurities: NMT 0.1%▲ (USP 1-Dec-2024)

• **LIMIT OF NONVOLATILE RESIDUE**

Sample: 100.0 g of Dimethyl Sulfoxide

Analysis: Evaporate the *Sample* to dryness in a tared, preconditioned dish on a hot plate under a suitable fume hood. Evaporate gently so that boiling does not occur.

Acceptance criteria: The weight of the residue is NMT 0.01%.

SPECIFIC TESTS

• **SPECIFIC GRAVITY ⟨841⟩:** 1.095–1.101

• **REFRACTIVE INDEX ⟨831⟩:** 1.4755–1.4775

• **ACIDITY**

Sample solution: 500 mg/mL of Dimethyl Sulfoxide in water

Analysis: To the *Sample solution*, add phenolphthalein TS. If the solution remains colorless, titrate with 0.01 N sodium hydroxide VS until a pink color appears.

Acceptance criteria: NMT 5.0 mL of 0.01 N sodium hydroxide is consumed.

• **WATER DETERMINATION ⟨921⟩, *Method I***

Analysis: Weigh and transfer the test specimen in an environment of low humidity to minimize absorption of atmospheric water.

Acceptance criteria: NMT 0.1%

Change to read:

• **ULTRAVIOLET ABSORBANCE**

Instrumental conditions

▲(See *Ultraviolet-Visible Spectroscopy ⟨857⟩*.)▲ (USP 1-Dec-2024)

Mode: UV

Spectral range: 270–350 nm

Cell: 1 cm

Blank: Water

Analysis: Maintain Dimethyl Sulfoxide in a water bath at a temperature of less than 20°. [NOTE—Do not freeze.] Purge with dry nitrogen for 30 min.

Acceptance criteria: The spectrum is smooth with no absorption maxima; the absorbance at 275 nm is NMT 0.20, and the absorbance ratio of A_{285}/A_{275} at the wavelengths indicated by the subscripts is NMT 0.65 and of A_{295}/A_{275} at the wavelengths indicated by the subscripts is NMT 0.45.

ADDITIONAL REQUIREMENTS

• **PACKAGING AND STORAGE:** Preserve in tight, light-resistant containers.

Change to read:

• **USP REFERENCE STANDARDS ⟨11⟩**

USP Dimethyl Sulfoxide RS

▲USP Methylsulfonylmethane RS▲ (USP 1-Dec-2024)

Auxiliary Information - Please check for your question in the FAQs before contacting USP.

Topic/Question	Contact	Expert Committee
DIMETHYL SULFOXIDE	Documentary Standards Support	SM32020 Small Molecules 3

Chromatographic Database Information: Chromatographic Database

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