Sodium Lauryl Sulfate

Add the following:

▲Portions of this monograph that are national *USP* text, and are not part of the harmonized text, are marked with symbols (♦◆) to specify this fact.▲*NF34*

Sulfuric acid monododecyl ester sodium salt; Sodium monododecyl sulfate [151-21-3].

DEFINITION

Change to read:

Sodium Lauryl Sulfate is a mixture of sodium alkyl sulfates consisting chiefly of sodium lauryl sulfate $[CH_3(CH_2)_{10}CH_2OSO_3Na]$. ▲It contains NLT 85.0% of sodium alkyl sulfates calculated as $C_{12}H_{25}NaO_4S$.▲*NF34*

IDENTIFICATION

Change to read:

• **A. IDENTIFICATION TESTS—GENERAL,** *Sodium* ⟨**191**⟩
▲**Potassium pyroantimonate solution:** To 2 g of potassium pyroantimonate add 100 mL of water. Boil the solution for about 5 min, cool quickly, and add 10 mL of a solution of potassium hydroxide (3 in 20). Allow to stand for 24 h, and filter.
Sample: 2.5 g
Analysis: Place the *Sample* in a silica or platinum crucible, and add 2 mL of 10 N sulfuric acid. Heat on a water bath, then cautiously raise the temperature progressively over an open flame. Ignite, preferably in a muffle furnace, at 600 ± 25°. Continue heating until all black particles have disappeared. Cool, add a few drops of 2 N sulfuric acid, and heat and ignite as above. Add a few drops of ammonium carbonate TS, evaporate to dryness, and ignite as above. Cool, dissolve the residue in 50 mL of water, and mix. To a 2-mL portion of this solution, add 4 mL of *Potassium pyroantimonate solution*. If necessary, rub the inside of the test tube with a glass rod.
Acceptance criteria: A white, crystalline precipitate is formed.▲*NF34*

Change to read:

• **B. IDENTIFICATION TESTS—GENERAL,** *Sulfate* ⟨**191**⟩
▲**Sample:** Solution (1 in 10)
Analysis: After acidification with hydrochloric acid and boiling for 20 min, no precipitate is formed. Add barium chloride TS; a white precipitate is produced.
Acceptance criteria: Meets the requirements▲*NF34*

Add the following:

▲• **C.**
Sample: 0.1 g
Analysis: Dissolve the *Sample* in 10 mL of water and shake.
Acceptance criteria: A copious foam is formed.▲*NF34*

Add the following:

▲• **D.**
Sample: Solution prepared for *Identification* test *C*
Analysis: To 0.1 mL of the *Sample*, add 0.1 mL of a 1 g/L solution of methylene blue and 2 mL of sulfuric acid, diluted. Add 2 mL of methylene chloride and shake.
Acceptance criteria: An intense blue color develops in the methylene chloride layer.▲*NF34*

ASSAY

Add the following:

▲• **CONTENT OF SODIUM ALKYL SULFATES**
Methylene blue solution: Dissolve 0.003 g of methylene blue, 5.0 g of anhydrous sodium sulfate, and 1.2 g of sulfuric acid in 100 mL of water.
[NOTE—Anhydrous sodium sulfate is the emulsion breaker.]
Sample: 1.5 g of Sodium Lauryl Sulfate
Titrimetric system
(See *Titrimetry* ⟨541⟩.)
Mode: Direct titration
Titrant: 0.004 M benzethonium chloride VS
Endpoint detection: Visual
Analysis
Dissolve the *Sample* in water, warming if necessary, and dilute with water to exactly 1000.0 mL. To 10.0 mL of the solution, add 25 mL of *Methylene blue solution*, 15 mL of methylene chloride, and 20 mL of water. Titrate with *Titrant*, shaking vigorously and allowing the layers to separate before each addition, until the two layers are almost the same blue color. One mL of *Titrant* is equivalent to 1.154 mg of sodium alkyl sulfates, calculated as $C_{12}H_{25}NaO_4S$.
Acceptance criteria: NLT 85.0%, calculated as $C_{12}H_{25}NaO_4S$▲*NF34*

IMPURITIES

Delete the following:

•• **HEAVY METALS,** *Method II* ⟨**231**⟩**:** 20 ppm• (Official 1-Dec-2015)

Change to read:

• **SODIUM CHLORIDE**
▲**Fluorescein sodium solution:** Dissolve 0.2 g of fluorescein sodium in water to 100 mL.
Dilute nitric acid: Dilute 105 mL of nitric acid with water to 1000 mL.▲*NF34*
Sample solution: 100 mg/mL ▲of Sodium Lauryl Sulfate▲*NF34* in water
Analysis: Neutralize 50 mL of *Sample solution* with ▲*Dilute nitric acid,*▲*NF34* using litmus paper as the indicator. ▲If necessary, add exactly 5.0 mL of 0.1 N sodium chloride▲*NF34* and titrate with 0.1 N silver nitrate VS ▲(indicator: 2 drops of *Fluorescein sodium solution*) to the first appearance of turbidity with solution color change from yellow-green to orange through yellow. Perform a blank determination, and make any necessary correction.▲*NF34* Each mL of 0.1 N silver nitrate is equivalent to 5.844 mg of sodium chloride.
▲**Acceptance criteria:** The combined content of sodium chloride and sodium sulfate is NMT 8.0%.▲*NF34*

Change to read:

- **SODIUM SULFATE**

▲Sample solution: 100 mg/mL of Sodium Lauryl Sulfate in water▲*NF34*

Analysis: ▲To 10 mL of *Sample solution*, add 100 mL of alcohol and heat at a temperature just below the boiling point for 2 h. Pass through a glass filter (pore size equivalent to 5–10 µm) while hot, and wash with 100 mL of boiling alcohol. Dissolve the precipitate by washing with 150 mL of water, collecting the washings in a beaker. Add 10 mL of hydrochloric acid, diluted, heat to boiling, add 25 mL of barium chloride TS, and allow to stand overnight. Collect the precipitate and wash with water until the last washing shows no opalescence with 0.1 N silver nitrate. Dry the precipitate, ignite to constant mass between 500° and 600° by raising the temperature gradually, and weigh as barium sulfate ($BaSO_4$; 233.39).

Amount (mg) of sodium sulfate (Na_2SO_4) = amount (mg) of barium sulfate ($BaSO_4$) × 0.6086▲*NF34*

Acceptance criteria: ▲The combined content of sodium chloride and sodium sulfate is NMT 8.0%.▲*NF34*

SPECIFIC TESTS

Change to read:

- **ALKALINITY**

Sample solution: Dissolve 1.0 g in 100 mL of water, add ▲0.1 mL of▲*NF34* phenol red TS, and titrate with 0.10 N hydrochloric acid.

Acceptance criteria: NMT ▲0.5▲*NF34* mL for neutralization

Change to read:

- ▲◆▲*NF34***TOTAL ALCOHOLS:** Transfer 5 g to an 800-mL Kjeldahl flask, and add 150 mL of water, 50 mL of hydrochloric acid, and a few boiling chips. Attach a reflux condenser to the Kjeldahl flask, heat carefully to avoid excessive frothing, and boil for 4 h. Cool the flask, rinse the condenser with ether, collecting the ether in the flask, and transfer the contents to a 500-mL separator, rinsing the flask twice with ether and adding the washings to the separator. Extract the solution with two 75-mL portions of ether, evaporate the combined ether extracts in a tared beaker on a steam bath, dry the residue at 105° for 30 min, cool, and weigh.

Acceptance criteria: The residue represents the total alcohols and is NLT 59.0% of the weight of Sodium Lauryl Sulfate taken.▲◆▲*NF34*

Change to read:

- **UNSULFATED ALCOHOLS**

Sample solution: Dissolve 10 g in 100 mL of water, and add 100 mL of alcohol.

Analysis: Transfer the solution to a separator, and extract with three 50-mL portions of ▲petroleum ether.▲*NF34* If an emulsion forms, sodium chloride may be added to promote separation of the two layers. Wash the combined ▲petroleum ether▲*NF34* extracts with three 50-mL portions of water, and dry with anhydrous sodium sulfate. Filter the ▲petroleum ether▲*NF34* extract into a tared beaker. Evaporate on a ▲water▲*NF34* bath until the odor of ▲petroleum ether▲*NF34* no longer is perceptible, dry the residue at 105° for 30 min, cool, and weigh.

Acceptance criteria: The weight of the residue is NMT 4.0% of the weight of Sodium Lauryl Sulfate taken.

ADDITIONAL REQUIREMENTS

- ▲◆▲*NF34***PACKAGING AND STORAGE:** Preserve in well-closed containers.▲◆▲*NF34*