B: To 1 mL of a solution (1 in 20) add a few drops of chlorine TS, and shake the mixture with 1 mL of chloroform: the latter assumes a brownish color.

Specific rotation ⟨781S⟩: between –24° and –26°.

Test solution: an amount equivalent to 50 mg of anhydrous Scopolamine Hydrobromide per mL, in water.

pH ⟨791⟩**:** between 4.0 and 5.5, in a solution (1 in 20).

Water, *Method III* ⟨921⟩**—**Dry it in two stages (see *Loss on drying* ⟨731⟩); first at 80° for 2 hours, and then at 105° for an additional 3 hours: it loses not more than 13.0% of its weight.

Residue on ignition ⟨281⟩**:** negligible, from 100 mg.

Limit of apoatropine—To 15 mL of a solution (1 in 100) add 0.05 mL of 0.1 N potassium permanganate VS: the solution is not completely decolorized within 5 minutes.

Other foreign alkaloids—To 1 mL of a solution (1 in 20) add a few drops of 6 N ammonium hydroxide: no turbidity is produced. Add 1 N potassium hydroxide to another 1-mL portion of the solution: only a transient whitish turbidity is produced.

Assay—Dissolve about 750 mg of Scopolamine Hydrobromide, accurately weighed, in a mixture of 30 mL of glacial acetic acid and 10 mL of mercuric acetate TS, warming slightly to effect solution. Cool the solution to room temperature, add 2 drops of crystal violet TS, and titrate with 0.1 N perchloric acid VS. Perform a blank determination, and make any necessary correction. Each mL of 0.1 N perchloric acid is equivalent to 38.43 mg of $C_{17}H_{21}NO_4 \cdot HBr$.

Scopolamine Hydrobromide Injection

» Scopolamine Hydrobromide Injection is a sterile solution of Scopolamine Hydrobromide in Water for Injection. It contains not less than 90.0 percent and not more than 110.0 percent of the labeled amount of $C_{17}H_{21}NO_4 \cdot HBr \cdot 3H_2O$.

Packaging and storage—Preserve in light-resistant, single-dose or multiple-dose containers, preferably of Type I glass.

USP Reference standards ⟨11⟩**—**
USP Scopolamine Hydrobromide RS
USP Endotoxin RS

Identification—

A: Transfer a volume of Injection, equivalent to about 3 mg of scopolamine hydrobromide, to a 50-mL separator, dilute with water, if necessary, to 10 mL, add 0.2 mL of ammonium hydroxide, and extract with 25 mL of chloroform. Add 50 mL of ether to the chloroform solution, and pass the mixture through a 25- × 250-mm chromatographic tube fitted with a pledget of glass wool at the base and packed with 2 g of purified siliceous earth that previously has been mixed with 1 mL of 0.2 N phosphoric acid saturated with sodium bromide. Discard the eluate, and pass 25 mL of water-saturated ether through the column and discard. Elute with 100 mL of water-saturated chloroform, collect the eluate in a suitable receiver, and evaporate just to dryness. Dissolve the residue in 1 mL of alcohol, and proceed as directed in *Identification* test *A* under *Scopolamine Hydrobromide*, beginning with "and evaporate the solution on a steam bath to dryness."

B: Add to the Injection silver nitrate TS: a yellowish white precipitate, insoluble in nitric acid but slightly soluble in 6 N ammonium hydroxide, is formed.

Bacterial endotoxins ⟨85⟩**—**It contains not more than 555.0 USP Endotoxin Units per mg of scopolamine hydrobromide.

pH ⟨791⟩: between 3.5 and 6.5.

Other requirements—It meets the requirements under *Injections* ⟨1⟩.

Assay—

pH 9.0 Buffer—Dissolve 34.8 g of dibasic potassium phosphate in 900 mL of water, and adjust with 3 N hydrochloric acid or 1 N sodium hydroxide, as necessary, to a pH of 9.0, determined electrometrically, and mix.

Internal standard solution—Transfer about 25 mg of homatropine hydrobromide to a 50-mL volumetric flask, dissolve in and dilute with water to volume, and mix. Prepare fresh daily.

Standard stock solution—Transfer about 10 mg of USP Scopolamine Hydrobromide RS, accurately weighed, to a 100-mL volumetric flask, dissolve in and dilute with water to volume, and mix. Prepare fresh daily.

Standard preparation—Pipet 10 mL of the *Standard stock solution* into a separator, add 2.0 mL of *Internal standard solution* and 5.0 mL of *pH 9.0 Buffer*, and carefully adjust the solution with 1 N sodium hydroxide to a pH of 9.0, avoiding any excess. Immediately extract with two 10-mL portions of methylene chloride, filter the methylene chloride extracts through 1 g of anhydrous sodium sulfate supported by a small cotton plug in a funnel into a 50-mL beaker, and evaporate under nitrogen to approximately 2.0 mL.

Assay solution—Transfer an accurately measured volume of Injection, equivalent to about 10 mg of scopolamine hydrobromide, to a 100-mL volumetric flask. Dilute with water to volume, and mix.

Assay preparation—Pipet 10 mL of the *Assay solution* into a separator, and proceed as directed for *Standard preparation*, beginning with "add 2.0 mL of *Internal standard solution*."

Chromatographic system (see *Chromatography* ⟨621⟩)—The gas chromatograph is equipped with a flame-ionization detector and a 2-mm × 1.8-m glass column packed with 3% liquid phase G3 on support S1AB. The carrier gas is nitrogen, flowing at a rate of 25 mL per minute. The column temperature is maintained at 225°. Chromatograph the *Standard preparation*, and record the peak responses as directed for *Procedure:* the resolution factor, *R*, between homatropine and scopolamine is not less than 5; the tailing factor is not more than 2.0; and the relative standard deviation for replicate injections is not more than 2.0%.

Procedure—Separately inject equal volumes (about 1 µL) of the *Standard preparation* and the *Assay preparation* into the chromatograph, record the chromatograms, and measure the peak areas. Calculate the ratio, A_U, of the area of the scopolamine hydrobromide peak to the area of the internal standard peak in the chromatogram from the *Assay preparation*, and similarly calculate the ratio, A_S, in the chromatogram from the *Standard preparation*. Calculate the quantity, in mg, of scopolamine hydrobromide ($C_{17}H_{21}NO_4 \cdot HBr \cdot 3H_2O$) in the volume of Injection taken by the formula:

$$1.141\,W(A_U / A_S)$$

in which 1.141 is the ratio of the molecular weight of scopolamine hydrobromide trihydrate to that of anhydrous scopolamine hydrobromide; *W* is the weight, in mg, of USP Scopolamine Hydrobromide RS in the *Standard preparation;* and A_U and A_S are as calculated above.

Scopolamine Hydrobromide Ophthalmic Ointment

» Scopolamine Hydrobromide Ophthalmic Ointment is Scopolamine Hydrobromide in a suitable ophthalmic ointment base. It contains not less than 90.0 percent and not more than 110.0 percent of the labeled amount of $(C_{17}H_{21}NO_4) \cdot HBr \cdot 3H_2O$. It is sterile.