to a 100-mL volumetric flask, dilute with water to volume, and mix (Standard solution). Concomitantly determine the absorbances of the assay solution and the Standard solution at the wavelength of maximum absorbance at about 367 nm, with a suitable spectrophotometer, using dimethylformamide solution (1 in 20) as the blank. Calculate the quantity, in mg, of furazolidone ($C_8H_7N_3O_5$) in each mL of the Oral Suspension taken by the formula:

$$20(C / V)(A_U / A_S)$$

in which C is the concentration, in µg per mL, of USP Furazolidone RS in the Standard solution; V is the volume, in mL, of Oral Suspension taken; and A_U and A_S are the absorbances of the assay solution and the Standard solution, respectively.

Furazolidone Tablets

» Furazolidone Tablets contain not less than 90.0 percent and not more than 110.0 per cent of the labeled amount of $C_8H_7N_3O_5$.

Packaging and storage—Preserve in tight, light-resistant containers, and avoid exposure to excessive heat.

USP Reference standards ⟨11⟩**—**
USP Furazolidone RS

Identification—Add a quantity of powdered Tablets, equivalent to about 50 mg of furazolidone, to 10 mL of a freshly prepared mixture of dimethylformamide and alcoholic potassium hydroxide TS (9:1): the solution turns purple, immediately changes to deep blue, and, upon standing for 10 minutes, again turns purple.

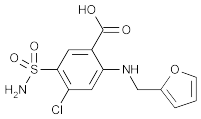
Uniformity of dosage units ⟨905⟩: meet the requirements.

Assay—Weigh and finely powder not fewer than 20 Tablets. Transfer an accurately weighed portion of the powder, equivalent to about 100 mg of furazolidone, to a 250-mL volumetric flask. Add about 150 mL of dimethylformamide, warm to about 50°, and sonicate to aid in dissolving the furazolidone. Cool, dilute with dimethylformamide to volume, mix, and centrifuge a portion of the mixture. Transfer 5.0 mL of the clear solution so obtained to a 250-mL volumetric flask, dilute with water to volume, and mix (assay solution). Similarly, dissolve a suitable quantity of USP Furazolidone RS, accurately weighed, in dimethylformamide to obtain a Standard stock solution having a known concentration of about 400 µg per mL. Transfer 5.0 mL of this stock solution to a 250-mL volumetric flask, dilute with water to volume, and mix (Standard solution). Concomitantly determine the absorbances of the assay solution and the Standard solution at the wavelength of maximum absorbance at about 367 nm, with a suitable spectrophotometer, using dimethylformamide solution (1 in 50) as the blank. Calculate the quantity, in mg, of $C_8H_7N_3O_5$ in the portion of Tablets taken by the formula:

$$12.5C(A_U / A_S)$$

in which C is the concentration, in µg per mL, of USP Furazolidone RS in the Standard solution; and A_U and A_S are the absorbances of the assay solution and the Standard solution, respectively.

Furosemide



$C_{12}H_{11}ClN_2O_5S$ 330.75
Benzoic acid, 5-(aminosulfonyl)-4-chloro-2-[(2-furanylmethyl) amino]-.
4-Chloro-*N*-furfuryl-5-sulfamoylanthranilic acid [54-31-9].

» Furosemide contains not less than 98.0 per cent and not more than 101.0 per cent of $C_{12}H_{11}ClN_2O_5S$, calculated on the dried basis.

Packaging and storage—Preserve in well-closed, light-resistant containers. Store at 25 °, excursions permitted between 15 ° and 30°.

USP Reference standards ⟨11⟩**—**
USP Furosemide RS
USP Furosemide Related Compound A RS
2-Chloro-4-*N*-furfurylamino-5-sulfamoylbenzoic acid.
$C_{12}H_{11}ClN_2O_5S$ 330.74
USP Furosemide Related Compound B RS
4-Chloro-5-sulfamoylanthranilic acid.
$C_7H_7ClN_2O_4S$ 250.66

Identification—

A: *Infrared Absorption* ⟨197K⟩.

B: *Ultraviolet Absorption* ⟨197U⟩—

Solution: 8 µg per mL.

Medium: 0.02 N sodium hydroxide.

Absorptivities at 271 nm, calculated on the dried basis, do not differ by more than 3.0%.

C: Dissolve about 5 mg in 10 mL of methanol. Transfer 1 mL of this solution to a flask, add 10 mL of 2.5 N hydrochloric acid, and reflux on a steam bath for 15 minutes. Cool, and add 15 mL of 1 N sodium hydroxide and 5 mL of sodium nitrite solution (1 in 1000). Allow the mixture to stand for 3 minutes, add 5 mL of ammonium sulfamate solution (1 in 200), mix, and add 5 mL of freshly prepared *N*-(1-naphthyl)ethylenediamine dihydrochloride solution (1 in 1000): a red to red-violet color is produced.

Loss on drying ⟨731⟩**—**Dry it at 105 ° for 3 hours: it loses not more than 1.0% of its weight.

Residue on ignition ⟨281⟩**:** not more than 0.1%.

Heavy metals, *Method II* ⟨231⟩**:** 0.002%.

Related compounds—[NOTE—Protect Furosemide solutions from exposure to light.]

Mobile phase—Prepare a filtered and degassed mixture of water, tetrahydrofuran, and glacial acetic acid (70:30:1). Make adjustments if necessary (see *System Suitability* under *Chromatography* ⟨621⟩).

Diluting solution—Dilute 22 mL of glacial acetic acid with a mixture of acetonitrile and water (50:50) to 1000 mL, and mix.

System suitability solution—Dissolve suitable quantities of USP Furosemide RS and USP Furosemide Related Compound A RS in *Diluting solution* to obtain a solution containing about 20 µg per mL and 12 µg per mL, respectively.

Standard solution—Prepare a solution in *Diluting solution* containing 5.0 µg each of USP Furosemide Related Compound A RS and USP Furosemide Related Compound B RS per mL.

Test solution—Transfer an accurately weighed quantity of Furosemide to a suitable volumetric flask, dissolve in and dilute with *Diluting solution* to volume to obtain a solution having a concentration of about 1.0 mg per mL, and mix.

Chromatographic system (see *Chromatography* ⟨621⟩)—The liquid chromatograph is equipped with a detector capable of

recording at both 254 nm and 272 nm and a 4.6-mm × 25-cm column that contains packing L1. [NOTE—The 2,4-dichloro-5-sulfamoylbenzoic acid impurity does not respond at 272 nm and the 2,4-bis(furfurylamino)-5-sulfamoylbenzoic acid impurity has a very intense absorbance at 254 nm.] The flow rate is about 1.0 mL per minute. Chromatograph the *System suitability solution,* and record the peak responses as directed for *Procedure:* the resolution, *R,* between furosemide and furosemide related compound A is not less than 2.5; and the relative standard deviation determined from furosemide is not more than 2.0%. [NOTE—The response for furosemide is at 254 nm.]

Procedure—Separately inject equal volumes (about 20 µL) of the *Standard solution* and the *Test solution* into the chromatograph, record the chromatograms, and measure the areas for the major peaks. [NOTE—The chromatographic run time is not less than 2.5 times the retention time of the furosemide peak.] The sum of the responses at 254 nm of those peaks eluting before furosemide in the chromatogram obtained from the *Test solution* is not more than the response at 254 nm of the furosemide related compound B peak in the chromatogram obtained from the *Standard solution* (0.5%). The sum of the responses at 272 nm of those peaks eluting after furosemide in the chromatogram obtained from the *Test solution* is not more than the response at 272 nm of the furosemide related compound A peak in the chromatogram obtained from the *Standard solution* (0.5%).

Assay—Dissolve about 600 mg of Furosemide, accurately weighed, in 50 mL of dimethylformamide to which has been added 3 drops of bromothymol blue TS, and which previously has been neutralized with 0.1 N sodium hydroxide. Titrate with 0.1 N sodium hydroxide VS to a blue endpoint. Each mL of 0.1 N sodium hydroxide is equivalent to 33.07 mg of $C_{12}H_{11}ClN_2O_5S$.

Furosemide Injection

» Furosemide Injection is a sterile solution of Furosemide in Water for Injection prepared with the aid of Sodium Hydroxide or, where intended solely for veterinary use, Diethanolamine or Monoethanolamine. It contains not less than 90.0 percent and not more than 110.0 per cent of the labeled amount of furosemide ($C_{12}H_{11}ClN_2O_5S$).

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

Labeling—Injection intended solely for veterinary use is so labeled.

USP Reference standards ⟨11⟩**—**
USP Endotoxin RS
USP Furosemide RS
USP Furosemide Related Compound A RS
2-Chloro-4-*N*-furfurylamino-5-sulfamoylbenzoic acid.
$C_{12}H_{11}ClN_2O_5S$ 330.74
USP Furosemide Related Compound B RS
4-Chloro-5-sulfamoylanthranilic acid.
$C_7H_7ClN_2O_4S$ 250.66

Identification—Transfer to a 100-mL volumetric flask a volume of Injection, equivalent to about 40 mg of furosemide, dilute with water to volume, and mix. Dilute 2.0 mL of this solution with 0.02 N sodium hydroxide in a second 100-mL volumetric flask to volume, and mix. Dissolve about 10 mg of USP Furosemide RS in 6.0 mL of 0.1 N sodium hydroxide in a 25-mL volumetric flask, and dilute with water to volume. Dilute 2.0 mL of the resulting solution quantitatively with 0.02 N sodium hydroxide to obtain a Standard solution having a concentration of about 8 µg per mL. Concomitantly determine the UV absorption spectra of both solutions: the UV absorption spectra so obtained exhibit maxima and minima at the same wavelengths.

Bacterial endotoxins ⟨85⟩**—**It contains not more than 3.6 USP Endotoxin Units per mg of furosemide.

pH ⟨791⟩**:** between 8.0 and 9.3 or, where labeled as intended solely for veterinary use, between 7.0 and 7.8 if it contains diethanolamine, or between 8.0 and 9.3 if it contains monoethanolamine.

Particulate matter ⟨788⟩**:** meets the requirements for small-volume injections.

Limit of furosemide related compound B—[NOTE—Protect furosemide solutions from exposure to light.]

Mobile phase, Diluting solution, System suitability solution and *Chromatographic system*—Prepare as directed in the test for *Related compounds* under *Furosemide*.

Standard solution—Prepare a solution in *Diluting solution* containing 10.0 µg of USP Furosemide Related Compound B RS per mL.

Test solution—Transfer an accurately measured volume of Injection, equivalent to about 10 mg of furosemide, to a 10-mL volumetric flask, add *Diluting solution* to volume, and mix.

Procedure—Separately inject equal volumes (about 20 µL) of the *Standard solution* and the *Test solution* into the chromatograph, record the chromatograms, and measure the peak responses. The response at 254 nm obtained for any peak observed in the chromatogram of the *Test solution* at a retention time corresponding to that of the Reference Standard in the *Standard solution* is not greater than the response at 254 nm obtained for the peak in the chromatogram of the *Standard solution*, corresponding to not more than 1.0% of furosemide related compound B. Where the Injection is labeled as intended solely for veterinary use, the response at 254 nm obtained in the chromatogram of the *Test solution* at a retention time corresponding to that of the Reference Standard in the *Standard solution* is not greater than 2.5 times the response at 254 nm obtained for the peak in the chromatogram of the *Standard solution*, corresponding to not more than 2.5% of furosemide related compound B.

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

Assay—[NOTE—Protect furosemide solutions from exposure to light.]

Mobile phase, Diluting solution, System suitability solution, and *Chromatographic system*—Prepare as directed in the test for *Related compounds* under *Furosemide*.

Standard preparation—Dissolve an accurately weighed quantity of USP Furosemide RS in *Diluting solution* to obtain a solution having a known concentration of about 1.0 mg per mL.

Assay preparation—Transfer an accurately measured volume of Injection, equivalent to about 10 mg of furosemide, to a 10-mL volumetric flask, add *Diluting solution* to volume, and mix.

Procedure—Separately inject equal volumes (about 20 µL) of the *Standard preparation* and the *Assay preparation* into the chromatograph, record the chromatograms, and measure the peak responses. Using the response at 254 nm, calculate the quantity, in mg, of furosemide ($C_{12}H_{11}ClN_2O_5S$) in each mL of the Injection taken by the formula:

$$10(C / V)(r_U / r_S)$$

in which C is the concentration, in mg per mL, of USP Furosemide RS in the *Standard preparation; V* is the volume, in mL, of Injection taken; and r_U and r_S are the peak responses obtained from the *Assay preparation* and the *Standard preparation*, respectively.