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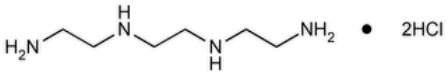
# Trientine Hydrochloride



$C_6H_{18}N_4 \cdot 2HCl$ 219.16

1,2-Ethanediamine, *N*,*N*′-bis(2-aminoethyl)-, dihydrochloride.

Triethylenetetramine dihydrochloride CAS RN®: 38260-01-4; UNII: HC3NX54582.

» Trientine Hydrochloride contains not less than 97.0 percent and not more than 103.0 percent of $C_6H_{18}N_4 \cdot 2HCl$, calculated on the dried basis.

**Packaging and storage**—Preserve under an inert gas in tight, light-resistant containers, and store in a refrigerator.

**USP Reference standards** ⟨11⟩—
USP Trientine Hydrochloride RS

***Change to read:***

**Identification,** ▲**Spectroscopic Identification Tests** ⟨197⟩, *Infrared Spectroscopy*: 197M▲ (CN 1-May-2020)

**pH** ⟨791⟩: between 7.0 and 8.5, in a solution (1 in 100).

**Loss on drying** ⟨731⟩—Dry it in vacuum at a pressure not exceeding 5 mm of mercury at 40° for 4 hours: it loses not more than 2.0% of its weight.

**Residue on ignition** ⟨281⟩: not more than 0.15%.

**Chromatographic purity**—The sum of the intensities of all secondary spots obtained from the *Test preparation* in *Part I* and *Part II* corresponds to not more than 2.0%.

*Part I*—

*Spray reagent*—Dissolve 300 mg of ninhydrin in a mixture of 100 mL of butyl alcohol and 3 mL of glacial acetic acid.

*Standard preparation A*—[Note—Use low-actinic glassware.] Dissolve an accurately weighed quantity of USP Trientine Hydrochloride RS in methanol to obtain a solution containing 10 mg per mL.

*Standard preparation B*—[Note—Use low-actinic glassware.] Dissolve an accurately weighed quantity of diethylenetriamine in methanol to obtain a solution containing 1.0 mg per mL. Transfer 3.0 mL of this solution to a 100-mL volumetric flask, dilute with methanol to volume, and mix.

*Standard preparation C*—[Note—Use low-actinic glassware.] Dissolve an accurately weighed quantity of 1-(2-aminoethyl)piperazine in methanol to obtain a solution containing 1.0 mg per mL. Transfer 10.0 mL of this solution to a 100-mL volumetric flask, dilute with methanol to volume, and mix.

*Standard preparation D*—[Note—Use low-actinic glassware.] Transfer 5.0 mL of *Standard preparation C* to a 10-mL volumetric flask, dilute with methanol to volume, and mix.

*Test preparation*—[Note—Use low-actinic glassware.] Dissolve an accurately weighed quantity of Trientine Hydrochloride in methanol to obtain a solution containing 10 mg per mL.

*Procedure*—Apply separately 3 µL each of the *Test preparation*, of *Standard preparation B*, and of *Standard preparation C* to a suitable unwashed, high performance thin-layer chromatographic plate (see *Chromatography* ⟨621⟩) having a 1.5-cm preadsorbent zone and coated with a 0.15-mm layer of chromatographic silica gel mixture. To a fourth spot, apply 3 µL each of *Standard preparations A*, *B*, and *C*. To a fifth spot, apply 3 µL each of *Standard preparations A*, *B*, and *D*. Allow the spots to dry, place the plate in a chromatographic chamber, and develop the chromatograms in a solvent system consisting of a mixture of isopropyl alcohol and ammonium hydroxide (3:2) until the solvent front has moved about three-fourths of the length of the plate. Remove the plate from the developing chamber, mark the solvent front, and dry the plate with the aid of a current of air. Spray the plate with *Spray reagent*, dry at 105° for 5 minutes, and observe the plate under long-wavelength UV light. Determine the locus of the diethylenetriamine and the 1-(2-aminoethyl)piperazine spots from the chromatograms of *Standard preparations B* and *C*, respectively. Determine the concentration of diethylenetriamine in the *Test preparation* by comparing the size and intensity of any secondary spot from the chromatogram of the *Test preparation* having an $R_F$ value corresponding to the $R_F$ value of diethylenetriamine with the diethylenetriamine spots obtained from the chromatograms of the *Standard preparation* mixtures. Determine the

concentration of any other observed impurities in the *Test preparation* by comparing the size and intensity of any other secondary spots from the chromatogram of the *Test preparation* with the 1-(2-aminoethyl)piperazine spots obtained from the chromatograms of the *Standard preparation* mixtures.

*Part II*—

*Spray reagent*—Dissolve 200 mg of ninhydrin in 100 mL of alcohol.

*Tris(2-aminoethyl)amine stock solution*— [NOTE—Use low-actinic glassware.] Dissolve an accurately weighed quantity of tris(2-aminoethyl)amine in methanol to obtain a solution containing 1.0 mg per mL.

*Standard preparation A*—[NOTE—Use low-actinic glassware.] Dissolve an accurately weighed quantity of USP Trientine Hydrochloride RS in methanol to obtain a solution containing 10 mg per mL.

*Standard preparation B*—[NOTE—Use low-actinic glassware.] Transfer 1.0 mL of *Tris(2-aminoethyl)amine stock solution* to a 10-mL volumetric flask, dilute with methanol to volume, and mix.

*Standard preparation C*—[NOTE—Use low-actinic glassware.] Transfer 0.5 mL of *Tris(2-aminoethyl)amine stock solution* to a 10-mL volumetric flask, dilute with methanol to volume, and mix.

*Test preparation*—[NOTE—Use low-actinic glassware.] Dissolve an accurately weighed quantity of Trientine Hydrochloride in methanol to obtain a solution containing 10 mg per mL.

*Procedure*—Apply separately 3 µL each of the *Test preparation* and of *Standard preparation A* to a suitable thin-layer chromatographic plate (see *Chromatography* ⟨621⟩) coated with a 0.25-mm layer of chromatographic silica gel mixture and previously washed with methanol. To a third spot apply 3 µL each of *Standard preparations A* and *B*. To a fourth spot, apply 3 µL each of *Standard preparations A* and *C*. Allow the spots to dry, place the plate in a chromatographic chamber, and develop the chromatograms in a solvent system consisting of a mixture of ammonium hydroxide and alcohol (2:1) at a temperature of 2° to 6° until the solvent front has moved about three-fourths of the length of the plate. Remove the plate from the developing chamber, mark the solvent front, and dry the plate with the aid of a current of air. Spray the plate with *Spray reagent*, dry at 105° for 5 minutes, and observe the plate under long-wavelength UV light. Determine the concentration of tris(2-aminoeth yl)amine in the *Test preparation* by comparing the size and intensity of any secondary spot from the chromatogram of the *Test preparation* having an $R_F$ value corresponding to the $R_F$ value of tris(2-aminoethyl)amine with the tris(2-aminoethyl)amine spots obtained from the chromatograms of the *Standard preparation* mixtures.

**Assay**—Dissolve about 220 mg of Trientine Hydrochloride, accurately weighed, in 150 mL of water in a 250-mL beaker. Adjust with hydrochloric acid to a pH of 2.0; then adjust with ammonium hydroxide to a pH of 9.5 ± 0.5; and then adjust with glacial acetic acid to a pH of 5.0. Heat the solution to 90°, and while hot, titrate with 0.1 N cupric nitrate VS, determining the endpoint potentiometrically, using an electrode system consisting of a cupric ion-selective electrode and a calomel reference electrode with an outer filling solution of 1 M potassium nitrate. Perform a blank determination (see *Titrimetry* ⟨541⟩), and make any necessary correction. Each mL of 0.1 N cupric nitrate is equivalent to 21.92 mg of $C_6H_{18}N_4 \cdot 2HCl$.

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

| Topic/Question | Contact | Expert Committee |
|---|---|---|
| TRIENTINE HYDROCHLORIDE | Documentary Standards Support | SM32020 Small Molecules 3 |
| REFERENCE STANDARD SUPPORT | RS Technical Services<br>RSTECH@usp.org | SM32020 Small Molecules 3 |

**Chromatographic Database Information:** Chromatographic Database

**Most Recently Appeared In:**
Pharmacopeial Forum: Volume No. Information currently unavailable

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