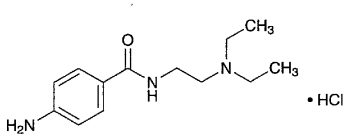
hydrochloric acid TS, and heat on a water-bath at 70°C for 30 minutes with occasional shaking. After cooling, add ethanol (95) to make exactly 250 mL, and filter. Discard the first 20 mL of the filtrate. To 5 mL of the subsequent filtrate, exactly measured, add 5 mL of 0.1 mol/L hydrochloric acid TS, dilute with ethanol (95) to exactly 250 mL, and use this solution as the sample solution. Separately, weigh accurately about 0.15 g of Probenecid Reference Standard, previously dried at 105°C for 4 hours, dissolve in 5 mL of 1 mol/L hydrochloric acid TS, and add ethanol (95) to make exactly 250 mL. Pipet 5 mL of the solution, add 5 mL of 0.1 mol/L hydrochloric acid TS and ethanol (95) to make exactly 250 mL, and use this solution as the standard solution. Determine the absorbances, $A_T$ and $A_S$, of the sample solution and the standard solution at 248 nm as directed under the Ultraviolet-visible Spectrophotometry, using a solution prepared by mixing 5 mL of 0.1 mol/L hydrochloric acid TS and ethanol (95) to make exactly 250 mL as the blank.

Amount (mg) of probenecid ($C_{13}H_{19}NO_4S$)
= amount (mg) of Probenecid Reference Standard
$\times \frac{A_T}{A_S}$

**Containers and storage** Containers—Well-closed containers.

# Procainamide Hydrochloride

塩酸プロカインアミド




$C_{13}H_{21}N_3O.HCl$: 271.79
4-Amino-*N*-(2-diethylaminoethyl)benzamide monohydrochloride [*614-39-1*]

Procainamide Hydrochloride, when dried, contains not less than 98.0% of $C_{13}H_{21}N_3O.HCl$.

**Description** Procainamide Hydrochloride occurs as a white to light yellow, crystalline powder. It is odorless.

It is very soluble in water, freely soluble in methanol, in acetic acid (100) and in ethanol (95), slightly soluble in acetic anhydride, and practically insoluble in diethyl ether.

It is hygroscopic.

**Identification** (1) Dissolve 1 g of Procainamide Hydrochloride in 10 mL of water, add 10 mL of sodium hydroxide TS, and extract with two 10-mL portions of a mixture of diethyl ether and chloroform (1:1). Combine the extracts, add calcium chloride for drying, and dry the extracts for 30 minutes. Decant the solution into a small flask, add 5 mL of pyridine, and slowly add dropwise 1 mL of benzoyl chloride. Heat the mixture on a water bath for 30 minutes, add 20 mL of a mixture of diethyl ether and chloroform (1:1), shake, and pour the mixture into 100 mL of sodium hydroxide TS, then shake. Separate the organic solvent layer, wash it with 20 mL of water, cool to 10°C, and allow the crystals to separate. Collect the separated crystals, recrystallize from 10 mL of dilute ethanol, and dry at 105°C for 1 hour: the crystals so obtained melt between 180°C and 187°C.

(2) Dissolve 0.01 g of Procainamide Hydrochloride in 1 mL of dilute hydrochloric acid and 4 mL of water: the solution responds to the Qualitative Tests for primary aromatic amines.

(3) A solution of Procainamide Hydrochloride (1 in 20) responds to the Qualitative Tests for chloride.

**pH** Dissolve 1.0 g of Procainamide Hydrochloride in 10 mL of water: the pH of this solution is between 5.0 and 6.5.

**Melting point** 165 - 169°C

**Purity** (1) Clarity of solution—Dissolve 1.0 g of Procainamide Hydrochloride in 10 mL of water: the solution is clear.

(2) Heavy metals—Proceed with 2.0 g of Procainamide Hydrochloride according to Method 2, and perform the test. Prepare the control solution with 2.0 mL of Standard Lead Solution (not more than 10 ppm).

(3) Arsenic—Prepare the test solution with 1.0 g of Procainamide Hydrochloride according to Method 1, and perform the test using Apparatus B (not more than 2 ppm).

(4) Related substances—Dissolve 0.20 g of Procainamide Hydrochloride in 10 mL of methanol, and use this solution as the sample solution. Pipet 1 mL of the sample solution, add methanol to make exactly 200 mL, and use this solution as the standard solution. Perform the test with these solutions as directed under the Thin-layer Chromatography. Spot 10 μL each of the sample solution and the standard solution on a plate of silica gel for thin-layer chromatography. Then spot 10 μL each of a solution of ammonia solution (28) in methanol (11 in 50) on each of the above spots. Develop the plate with a mixture of chloroform, methanol and ammonia solution (28) (700:300:7) to a distance of about 10 cm, and air-dry the plate. Spray evenly 4-dimethylaminobenzaldehyde TS for spray on the plate: the spots other than the principal spot from the sample solution are not more intense than the spot from the standard solution.

**Loss on drying** Not more than 0.30% (2 g, 105°C, 4 hours).

**Residue on ignition** Not more than 0.10% (2 g).

**Assay** Weigh accurately about 0.5 g of Procainamide Hydrochloride, previously dried, dissolve in 50 mL of a mixture of acetic anhydride and acetic acid (100) (7:3), and titrate with 0.1 mol/L perchloric acid VS (potentiometric titration). Perform a blank determination, and make any necessary correction.

Each mL of 0.1 mol/L perchloric acid VS
= 27.179 mg of $C_{13}H_{21}N_3O.HCl$

**Containers and storage** Containers—Tight containers.