**Procainamide hydrochloride (Procainamidi hydrochloridum)**

**Molecular formula.** \( \text{C}_{13}\text{H}_{21}\text{N}_3\text{O}\cdot\text{HCl} \)

**Relative molecular mass.** 271.8

**Graphic formula.**

![Graphic formula image]

**Chemical name.** \( p\)-Amino-\( \text{N-[2-(diethylamino)ethyl]} \)benzamide monohydrochloride; 4-amino-\( \text{N-[2-(diethylamino)ethyl]} \)benzamide monohydrochloride; CAS Reg. No. 614-39-1.

**Description.** A white to yellowish white, crystalline powder; odourless.

**Solubility.** Very soluble in water; freely soluble in ethanol (~750 g/l) TS; very slightly soluble in ether R.

**Category.** Antiarrhythmic.

**Storage.** Procainamide hydrochloride should be kept in a tightly closed container, protected from light.

**Additional information.** Procainamide hydrochloride is hygroscopic. Even in the absence of light, Procainamide hydrochloride is gradually degraded on exposure to a humid atmosphere, the decomposition being faster at higher temperatures.

**Requirements**

**Definition.** Procainamide hydrochloride contains not less than 98.0% and not more than 101.0% of \( \text{C}_{13}\text{H}_{21}\text{N}_3\text{O}\cdot\text{HCl} \), calculated with reference to the dried substance.

**Identity tests**

A. Dissolve 1 g in 10 mL of water, add 10 mL of sodium hydroxide (~200 g/l) TS, and extract with 10 mL of chloroform R. To the extract add 10 mL of toluene R, dry over anhydrous sodium sulfate R, and filter. Mix the filtrate with 5 mL of anhydrous pyridine R, add 1 mL of benzoyl chloride R drop by drop, heat on a water-bath for 30 minutes, and pour into a mixture of 50 mL of water and 50 mL of sodium hydroxide (~200 g/l) TS. Extract with 10 mL of ether R, wash the extract with 20 mL of water, dilute with 30 mL of ether R, and allow to crystallize. Recrystallize from ethanol (~375 g/l) TS; melting temperature, about 185°C (benzoyl procainamide).

B. Dissolve 0.1 g in 2 mL of water and add 2 mL of potassium ferrocyanide (45 g/l) TS. Add a few drops of hydrochloric acid (~70 g/l) TS to acidify slightly and heat; a light green precipitate is produced.

C. A 0.05 g/mL solution yields reaction B described under 2.1 General identification tests as characteristic of chlorides.

**Melting range.** 165-169°C.

**Heavy metals.** Use 1.0 g for the preparation of the test solution as described under 2.2.3 Limit test for heavy metals. Procedure 3; determine the heavy metals content according to Method A; not more than 20 μg/g.

**Sulfated ash.** Not more than 1.0 mg/g.

**Loss on drying.** Dry to constant weight at 105°C: it loses not more than 3.0 mg/g.

**pH value.** pH of a 0.10 g/mL solution in carbon-dioxide-free water R, 5.0-6.5.

**Related substances.** Carry out the test as described under 1.14.1 Thin-layer chromatography, using silica gel R2 as the coating substance and a mixture of 4 volumes of 1-butanol R, 1 volume of glacial acetic acid R, and 2 volumes of water as the mobile phase. Apply separately to the plate 2 μl of each of 2 solutions in ethanol (~750 g/l) TS containing (A) 50 mg of the test substance per mL and (B) 0.25 mg of the test substance per mL. After removing the plate from the chromatographic chamber, allow it dry in air, and examine the chromatogram in ultraviolet light (254 nm). Any spot obtained with solution A, other than the principal spot, is not more intense than that obtained with solution B.

**Assay.** Dissolve about 0.25 g, accurately weighed, in 5 mL of acetic anhydride R and 15 mL of glacial acetic acid R1. Heat the solution until boiling. Add 20 mL of dioxan R and 20 mL of mercuric acetate/acetic acid TS and titrate with perchloric acid (0.1 mol/l) VS as described under 2.6 Non-aqueous titration. Method A. Each mL of perchloric acid (0.1 mol/l) VS is equivalent to 27.18 mg of \( \text{C}_{13}\text{H}_{21}\text{N}_3\text{O}\cdot\text{HCl} \).
Additional requirements for Procainamide hydrochloride for parenteral use

Complies with the monograph for "Parenteral preparations".

**Bacterial endotoxins.** Carry out the test as described under 3.4 Test for bacterial endotoxins; contains not more than 0.35 IU of endotoxin RS per mg.