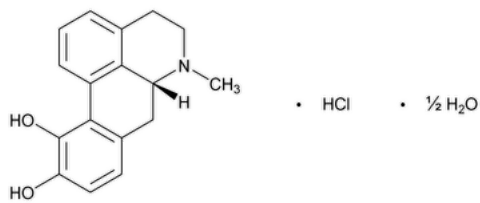


Status: Currently Official on 17-Feb-2025
Official Date: Official as of 01-May-2020
Document Type: USP Monographs
DocId: GUID-34DF5A1F-8307-456D-82C2-1B8E7E80B93F_4_en-US
DOI: https://doi.org/10.31003/USPNF_M5660_04_01
DOI Ref: 14v9c

© 2025 USPC
Do not distribute

Apomorphine Hydrochloride



$C_{17}H_{17}NO_2 \cdot HCl \cdot \frac{1}{2}H_2O$ 312.79
 $C_{17}H_{17}NO_2 \cdot HCl$ 303.79
4*H*-Dibenzo[*de,g*]quinoline-10,11-diol, 5,6,6a,7-tetrahydro-6-methyl-, hydrochloride, hemihydrate, (*R*)-;
6aβ-Aporphine-10,11-diol hydrochloride hemihydrate CAS RN®: 41372-20-7; UNII: F39049Y068.
Anhydrous CAS RN®: 314-19-2; UNII: 9K13MD7A0D.

DEFINITION
Apomorphine Hydrochloride contains NLT 98.5% and NMT 101.5% of apomorphine hydrochloride ($C_{17}H_{17}NO_2 \cdot HCl$), calculated on the dried basis.

IDENTIFICATION

Change to read:

- **A.** [▲ SPECTROSCOPIC IDENTIFICATION TESTS \(197\), Infrared Spectroscopy: 197K▲](#) (CN 1-MAY-2020)
- **B.** [IDENTIFICATION TESTS—GENERAL, Chloride \(191\)](#)

Sample solution: 10 mg/mL of Apomorphine Hydrochloride in carbon dioxide-free water
Analysis: To 2 mL of the *Sample solution* add 0.1 mL of nitric acid. Mix, filter, and use the filtrate.
Acceptance criteria: Meets the requirements

ASSAY

- **PROCEDURE**
Sample solution: Dissolve 250 mg of Apomorphine Hydrochloride in a mixture of 5.0 mL of 0.01 N hydrochloric acid and 50 mL of alcohol.
Analysis: Titrate the *Sample solution* with 0.1 N sodium hydroxide VS. Read the volume added between the first two points of inflexion. Each mL of 0.1 N sodium hydroxide is equivalent to 30.38 mg of apomorphine hydrochloride ($C_{17}H_{17}NO_2 \cdot HCl$).
Acceptance criteria: 98.5%–101.5% on the dried basis

IMPURITIES

- [RESIDUE ON IGNITION \(281\)](#): NMT 0.1%
- **ORGANIC IMPURITIES**
Diluent: Glacial acetic acid and water (1:99)
Solution A: 1.1-g/L solution of sodium octanesulfonate, adjusted with diluted phosphoric acid (1:1) to a pH of 2.2
Solution B: Acetonitrile
Mobile phase: See [Table 1](#).

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	85	15
2	85	15
32	68	32
37	68	32

Return to original conditions and re-equilibrate the system.

System suitability solution: 0.25 mg/mL each of [USP Apomorphine Hydrochloride RS](#) and boldine in *Diluent*. [NOTE—Boldine is 2,9-dihydroxy-1,10-dimethoxyaporphine.]

Standard solution: 2.5 µg/mL of [USP Apomorphine Hydrochloride RS](#) in *Diluent*

Sensitivity solution: 0.14 µg/mL of [USP Apomorphine Hydrochloride RS](#) in *Diluent* from the *Standard solution*. [NOTE—The peak response of this solution is equivalent to that of a solution containing 1.25 µg/mL of morphine hydrochloride, taking into account the relative response factor of this impurity (see [Table 2](#)).]

Sample solution: 2.5 mg/mL of Apomorphine Hydrochloride in *Diluent*

Chromatographic system

(See [Chromatography \(621\), System Suitability](#).)

Mode: LC

Detector: UV 280 nm

Column: 4.6-mm × 15-cm; 5-µm end-capped packing L1

Column temperature: 35°

Flow rate: 1.5 mL/min

Injection volume: 10 µL

System suitability

Samples: *System suitability solution* and *Sensitivity solution*

[NOTE—The typical relative retention times for boldine and apomorphine are about 0.9 and 1.0, respectively.]

Suitability requirements

Resolution: NLT 2.5 between boldine and apomorphine, *System suitability solution*

Signal-to-noise ratio: NLT 10, *Sensitivity solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of any individual impurity in the portion of Apomorphine Hydrochloride taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (1/F) \times 100$$

r_U = peak response of each impurity from the *Sample solution*

r_S = peak response of apomorphine from the *Standard solution*

C_S = concentration of [USP Apomorphine Hydrochloride RS](#) in the *Standard solution* (mg/mL)

C_U = concentration of Apomorphine Hydrochloride in the *Sample solution* (mg/mL)

F = relative response factor (see [Table 2](#))

Acceptance criteria: See [Table 2](#). Disregard any peak below 0.05%.

Table 2

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Morphine	0.4	0.11	0.15
Apomorphine	1.0	—	—
Any other individual impurity	—	1.0	0.10
Total impurities	—	—	0.5

SPECIFIC TESTS

• [OPTICAL ROTATION, Specific Rotation \(781S\)](#)

Sample solution: 10 mg/mL in *Diluent*

Diluent: 2.06-g/L solution of hydrochloric acid in water

Acceptance criteria: −48° to −52°, determined at 20°

• [LOSS ON DRYING \(731\)](#)

Analysis: Dry a sample at 105° for 2 h.

Acceptance criteria: 2.0%–4.2%

• COLOR OF SOLUTION

Sample solution: Place 100 mg of Apomorphine Hydrochloride in a suitable test tube, add 10 mL of cold, oxygen-free water, and agitate gently until dissolved.

Standard solution: Dissolve 5 mg of Apomorphine Hydrochloride in 100.0 mL of water. Transfer 1.0 mL of this solution to a test tube of the same size as that used for the *Sample solution*. Dilute with 6 mL of water, add 1 mL of a 50-mg/mL sodium bicarbonate solution, and then add 0.50 mL of iodine TS. Allow to stand for 30 s, add 0.60 mL of a 25-mg/mL sodium thiosulfate solution, and dilute with water to 10 mL.

Acceptance criteria: The color of the *Sample solution*, observed promptly after the Apomorphine Hydrochloride has dissolved, is not more intense than that of a color of the *Standard solution*.

ADDITIONAL REQUIREMENTS

- **PACKAGING AND STORAGE:** Preserve in tight, light-resistant containers.
- **USP REFERENCE STANDARDS (11).**
[USP Apomorphine Hydrochloride RS](#)

Auxiliary Information - Please [check for your question in the FAQs](#) before contacting USP.

Topic/Question	Contact	Expert Committee
APOMORPHINE HYDROCHLORIDE	Documentary Standards Support	SM32020 Small Molecules 3
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM32020 Small Molecules 3

Chromatographic Database Information: [Chromatographic Database](#)

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. PF 39(2)

Current DocID: GUID-34DF5A1F-8307-456D-82C2-1B8E7E80B93F_4_en-US
DOI: https://doi.org/10.31003/USPNF_M5660_04_01
DOI ref: [14v9c](#)