

Norethindrone Acetate Tablets

DEFINITION
Norethindrone Acetate Tablets contain NLT 90.0% and NMT 110.0% of the labeled amount of norethindrone acetate ($C_{22}H_{28}O_3$).

IDENTIFICATION
Delete the following:

▲ **A. [INFRARED ABSORPTION](#) (197K).**
Analysis: Mix an amount of powdered Tablets equivalent to 50 mg of norethindrone with 15 mL of solvent hexane. Stir the solution occasionally for 15 min. Centrifuge the mixture, then decant and discard the solvent hexane. Extract the residue with two 10-mL portions of solvent hexane, centrifuging and decanting as before, and discard the solvent hexane. Add 25 mL of chloroform to the residue, mix by shaking for 1–2 min, and filter. Evaporate the filtrate to about 3 mL, add a few mL of solvent hexane to induce crystallization, and evaporate to dryness.
Acceptance criteria: The IR absorption spectrum of a potassium bromide dispersion prepared from the residue so obtained exhibits maxima only at the same wavelengths as that of a similar preparation of [USP Norethindrone Acetate RS](#). ▲_{2S} (USP41)

Add the following:
▲ **A.** The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the Assay. ▲_{2S} (USP41)
Add the following:
▲ **B.** The UV spectrum of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the Assay. ▲_{2S} (USP41)

ASSAY
Change to read:
• **PROCEDURE**
▲ **Solution A:** [Water](#)
Solution B: [Acetonitrile](#)
Mobile phase: See [Table 1](#).

Table 1

Time (min)	Solution A (%)	Solution B (%)
0.0	60	40
4.0	60	40
40.0	40	60
50.0	10	90
55.0	10	90
56.0	60	40

Time (min)	Solution A (%)	Solution B (%)
60.0	60	40

Diluent: [Methanol](#) and [water](#) (60:40)

System suitability stock solution: 0.1 mg/mL each of [USP Norethindrone Acetate RS](#), [USP Norethindrone RS](#), and [USP Norethindrone Related Compound B RS](#) prepared as follows. Transfer the Reference Standards to a suitable volumetric flask. Add 50% of the final flask volume of [acetonitrile](#) to dissolve, and dilute with *Diluent* to volume.

System suitability solution: 0.05 mg/mL each of [USP Norethindrone Acetate RS](#), [USP Norethindrone RS](#), and [USP Norethindrone Related Compound B RS](#) in *Diluent* from *System suitability stock solution*

Standard solution: 0.1 mg/mL of [USP Norethindrone Acetate RS](#) in *Diluent*

Sample solution: Nominally 0.1 mg/mL of norethindrone acetate in *Diluent* prepared as follows. Transfer a quantity of finely powdered Tablets (NLT 20) equivalent to 20 mg of norethindrone acetate to a 20-mL volumetric flask. Add 15 mL of *Diluent* and sonicate for 30 min. Dilute with *Diluent* to volume. Centrifuge to obtain a clear supernatant. Transfer 5.0 mL of the supernatant to a 50-mL volumetric flask, and dilute with *Diluent* to volume.

Chromatographic system

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

Mode: LC

Detector: UV 254 nm. For *Identification B*, use a diode array detector in the range of 200–400 nm.

Column: 4.6-mm × 25-cm; 5-μm packing [L7](#)

Column temperature: 40°

Flow rate: 1.2 mL/min

Injection volume: 50 μL

System suitability

Samples: *System suitability solution* and *Standard solution*

[NOTE—See [Table 2](#) for relative retention times.]

Suitability requirements

Resolution: NLT 2.0 between norethindrone related compound B and norethindrone, *System suitability solution*

Tailing factor: NMT 1.5, *Standard solution*

Relative standard deviation: NMT 1.0%, *Standard solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of norethindrone acetate ($C_{22}H_{28}O_3$) in the portion of Tablets taken:

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

r_U = peak response from the *Sample solution*

r_S = peak response from the *Standard solution*

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

C_U = nominal concentration of norethindrone acetate in the *Sample solution* (mg/mL)

▲2S (USP41)

Acceptance criteria: 90.0%–110.0%

PERFORMANCE TESTS

• [DISSOLUTION \(711\)](#)

Test 1

Medium: Dilute [hydrochloric acid](#) (1 in 100) containing 0.02% of [sodium lauryl sulfate](#); 900 mL

Apparatus 1: 100 rpm

Time: 60 min

Standard solution: A known concentration of [USP Norethindrone Acetate RS](#) in *Medium*. [NOTE—The *Standard solution* may be prepared by dissolving the Reference Standard in a volume of methanol, not exceeding 0.5% of the final volume of the solution, and diluting quantitatively with *Medium*.]