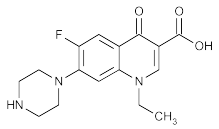
Column: 6-mm × 40-mm; 3-µm packing L1
Guard column: 4-mm × 12.5-mm; 5-µm packing L1
Flow rate: 1 mL/min
Injection size: 200 µL
System suitability
Sample: *Standard solution*
Suitability requirements
Column efficiency: NLT 500 theoretical plates for ethinyl estradiol and NLT 1400 theoretical plates for norethindrone acetate
Tailing factor: NMT 2.0 for norethindrone acetate and ethinyl estradiol
Relative standard deviation: NMT 2.5% for norethindrone acetate and ethinyl estradiol
Analysis
Samples: *Standard solution* and *Sample solution*
Tolerances: NLT 80% (Q) of the labeled amounts of norethindrone acetate ($C_{22}H_{28}O_3$) and ethinyl estradiol ($C_{20}H_{24}O_2$) is dissolved.

- **UNIFORMITY OF DOSAGE UNITS ⟨905⟩:** Meet the requirements

ADDITIONAL REQUIREMENTS

- **PACKAGING AND STORAGE:** Preserve in well-closed containers. Store at controlled room temperature.
- **USP REFERENCE STANDARDS ⟨11⟩**
  USP Ethinyl Estradiol RS
  USP Norethindrone Acetate RS

Norfloxacin



$C_{16}H_{18}FN_3O_3$ 319.33
3-Quinolinecarboxylic acid, 1-ethyl-6-fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)-.
1-Ethyl-6-fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)-3-quinolinecarboxylic acid [70458-96-7].

» Norfloxacin contains not less than 99.0 percent and not more than 101.0 percent of $C_{16}H_{18}FN_3O_3$, calculated on the dried basis.

Packaging and storage—Preserve in tight, light-resistant containers.

USP Reference standards ⟨11⟩**—**
USP Norfloxacin RS

Identification—

A: *Infrared Absorption* ⟨197M⟩.

B: *Ultraviolet Absorption* ⟨197U⟩—[NOTE—Use low actinic glassware in this procedure.]

Solution: 5 µg per mL.

Medium: 0.1 N sodium hydroxide.

Absorptivities at 273 nm, calculated on the dried basis, do not differ by more than 3.0%.

Loss on drying ⟨731⟩**—**Dry it in vacuum at a pressure not exceeding 5 mm of mercury at 100° to constant weight: it loses not more than 1.0% of its weight.

Residue on ignition ⟨281⟩: not more than 0.1%, a platinum crucible being used.

Heavy metals, *Method II* ⟨231⟩: 0.0015%.

Chromatographic purity—Dissolve a quantity of Norfloxacin in a mixture of methanol and methylene chloride (1:1) to obtain a test solution containing 8.0 mg per mL. Dissolve 4.0 mg of USP Norfloxacin RS in 1 mL of glacial acetic acid, add 4 mL of methanol, and mix. To 1 mL of this Standard stock solution add 9 mL of the mixture of methanol and methylene chloride (1:1) to obtain *Comparison solution A.* Dilute a portion of this solution with an equal volume of the mixture of methanol and methylene chloride (1:1) to obtain *Comparison solution B.* Separately apply 5 µL of the test solution, 1, 1.5, and 2 µL of *Comparison solution A*, and 5 µL of *Comparison solution B* to a suitable high-performance thin-layer chromatographic plate (see *Chromatography* ⟨621⟩) coated with a 0.25-mm layer of silica gel mixture, previously washed with methanol and air-dried. The spots of *Comparison solutions A* and *B* are equivalent to 0.2, 0.3, 0.4, and 0.5% of impurities, respectively. Place the plate in a paper-lined chromatographic chamber previously equilibrated with a solvent system consisting of a mixture of chloroform, methanol, toluene, diethylamine, and water (40:40:20:14:8). Seal the chamber and allow the chromatogram to develop until the solvent front has moved about nine-tenths of the length of the plate. Remove the plate from the chamber, mark the solvent front, allow the solvent to evaporate, and examine the plate under both short- and long-wavelength UV light. Compare the intensities of any secondary spots observed in the chromatogram of the test solution with those of the principal spots in the chromatograms of *Comparison solutions A* and *B*: the sum of the intensities of secondary spots obtained from the test solution corresponds to not more than 0.5% of impurities.

Assay—Dissolve about 460 mg of Norfloxacin, accurately weighed, in 100 mL of glacial acetic acid. Titrate potentiometrically with 0.1 N perchloric acid VS using a suitable anhydrous electrode system (see *Titrimetry* ⟨541⟩). [NOTE—Remove any aqueous solution in the electrode(s), render anhydrous, and fill with 0.1 N lithium perchlorate in acetic anhydride.] Perform a blank determination, and make any necessary correction. Each mL of 0.1 N perchloric acid is equivalent to 31.93 mg of $C_{16}H_{18}FN_3O_3$.

Norfloxacin Ophthalmic Solution

» Norfloxacin Ophthalmic Solution is a sterile, aqueous solution of Norfloxacin. It contains not less than 90.0 percent and not more than 110.0 percent of the labeled amount of norfloxacin ($C_{16}H_{18}FN_3O_3$).

Packaging and storage—Preserve in tight, light-resistant containers, stored at controlled room temperature.

USP Reference standards ⟨11⟩**—**
USP Norfloxacin RS

Identification—

A: *Ultraviolet Absorption* ⟨197U⟩—

Solution: about 0.06 mg of norfloxacin per mL.

Diluent: 0.1 N hydrochloric acid.

B: The retention time of the major peak in the chromatogram of the *Assay preparation* corresponds to that in the chromatogram of the *Standard preparation*, as obtained in the *Assay*.

Sterility ⟨71⟩: meets the requirements.

pH ⟨791⟩: between 5.0 and 5.4.

Assay—

Dilute phosphoric acid solution—Prepare a solution of phosphoric acid in water (1 in 1000).

Mobile phase—Prepare a filtered and degassed mixture of *Dilute phosphoric acid solution* and acetonitrile (850:150). Make adjustments if necessary (see *System Suitability* under *Chromatography* ⟨621⟩).

Standard preparation—Prepare a solution of USP Norfloxacin RS in *Dilute phosphoric acid solution* having a known concentration of about 0.06 mg per mL.