Levorphanol Tartrate Injection

» Levorphanol Tartrate Injection is a sterile solution of Levorphanol Tartrate in Water for Injection. It contains not less than 93.0 percent and not more than 107.0 percent of the labeled amount of $C_{17}H_{23}NO.C_4H_6O_6 \cdot 2H_2O$.

Packaging and storage—Preserve in single-dose or in multiple-dose containers, preferably of Type I glass.

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

Identification—

A: To 1 mL of Injection add 1 drop of 3 N hydrochloric acid and 2 drops of ferric chloride TS. Heat to boiling, and add 1 mL of potassium ferricyanide solution (1 in 200): a blue-green color develops.

B: The angular rotation of the Injection is levorotatory (see *Optical Rotation* ⟨781⟩).

Bacterial endotoxins ⟨85⟩**—**It contains not more than 125.0 USP Endotoxin Units per mg of levorphanol tartrate.

pH ⟨791⟩: between 4.1 and 4.5.

Other requirements—It meets the requirements under *Injections* ⟨1⟩.

Assay—Transfer an accurately measured volume of Injection, equivalent to about 40 mg of levorphanol tartrate, to a 125-mL separator. Add 5 g of sodium chloride and sufficient sodium bicarbonate to render the solution alkaline to litmus, add an additional 100 mg of sodium bicarbonate, and extract the levorphanol with five 20-mL portions of a mixture of 3 volumes of ether and 1 volume of chloroform. Pass the combined extracts through a layer of about 10 g of granular anhydrous sodium sulfate into a 500-mL conical flask, and evaporate to a volume of about 30 mL. Add about 50 mL of chloroform and 1 drop of methanolic methyl red TS, and titrate with 0.01 N perchloric acid in dioxane VS to a red endpoint. Perform a blank determination, and make any necessary correction. Each mL of 0.01 N perchloric acid is equivalent to 4.435 mg of $C_{17}H_{23}NO \cdot C_4H_6O_6 \cdot 2H_2O$.

Levorphanol Tartrate Tablets

» Levorphanol Tartrate Tablets contain not less than 93.0 percent and not more than 107.0 percent of the labeled amount of levorphanol tartrate ($C_{17}H_{23}NO \cdot C_4H_6O_6 \cdot 2H_2O$).

Packaging and storage—Preserve in well-closed containers.

USP Reference standards ⟨11⟩**—**
USP Levorphanol Tartrate RS

Identification—

A: Powder finely a number of Tablets. To a portion of the powder, equivalent to about 1 mg of levorphanol tartrate, add 1 mL of water, 1 drop of 3 N hydrochloric acid, and 2 drops of ferric chloride TS, and heat to boiling. To the hot solution add 1 mL of potassium ferricyanide solution (1 in 200): a bluish color develops.

B: Powder a number of Tablets, equivalent to about 60 mg of levorphanol tartrate, and transfer the mixture to a small separator. Add 10 mL of water, dissolve as much of the powder as possible, add about 400 mg of sodium bicarbonate, and extract with a 50-mL portion of chloroform. Evaporate the filtered chloroform extract on a steam bath to a small volume, dilute with chloroform to 10 mL, and determine the angular rotation: the solution is levorotatory (see *Optical Rotation* ⟨781⟩).

Dissolution ⟨711⟩**—**

Medium: water; 500 mL.

Apparatus 2: 50 rpm.

Time: 30 minutes.

*Procedure—*Determine the amount of $C_{17}H_{23}NO \cdot C_4H_6O_6 \cdot 2H_2O$ dissolved from UV absorbances at the wavelength of maximum absorbance at about 279 nm on filtered portions of the solution under test, suitably diluted with water, in comparison with a Standard solution having a known concentration of USP Levorphanol Tartrate RS in the same medium.

*Tolerances—*Not less than 75% *(Q)* of the labeled amount of $C_{17}H_{23}NO \cdot C_4H_6O_6 \cdot 2H_2O$ is dissolved in 30 minutes.

Uniformity of dosage units ⟨905⟩: meet the requirements.

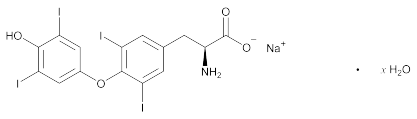
*Procedure for content uniformity—*Transfer 1 Tablet to a glass-stoppered flask, add 25.0 mL of 0.1 N hydrochloric acid, and allow the Tablet to disintegrate. Shake well, and filter through a small filter paper, discarding the first portion of the filtrate. Dilute a portion of the filtrate quantitatively and stepwise, if necessary, to provide a solution containing about 80 µg of levorphanol tartrate per mL. Concomitantly determine the absorbances of this solution and of a solution of USP Levorphanol Tartrate RS in the same medium having a known concentration of about 80 µg of anhydrous levorphanol tartrate per mL, in 1-cm cells at the wavelength of maximum absorbance at about 279 nm, with a suitable spectrophotometer, using 0.1 N hydrochloric acid as the blank. Calculate the quantity, in mg, of $C_{17}H_{23}NO \cdot C_4H_6O_6 \cdot 2H_2O$ in the Tablet taken by the formula:

$$(443.49 / 407.47)(TC / D)(A_U / A_S)$$

in which 443.49 and 407.47 are the molecular weights of the hydrated and anhydrous forms of levorphanol tartrate, respectively; T is the labeled quantity, in mg, of levorphanol tartrate in the Tablet; C is the concentration, in µg per mL, of USP Levorphanol Tartrate RS, on the anhydrous basis, in the Standard solution; D is the concentration, in µg per mL, of levorphanol tartrate in the solution from the Tablet, based on the labeled quantity per Tablet and the extent of dilution; and A_U and A_S are the absorbances of the solution from the Tablet and the Standard solution, respectively.

Assay—Weigh and finely powder not less than 20 Tablets. Weigh accurately a portion of the powder, equivalent to about 40 mg of levorphanol tartrate, transfer to a 125-mL separator, add 20 mL of water and sufficient sodium bicarbonate to render the suspension alkaline to litmus, and proceed as directed in the *Assay* under *Levorphanol Tartrate Injection*, beginning with "add an additional 100 mg of sodium bicarbonate."

Levothyroxine Sodium



$C_{15}H_{10}I_4NNaO_4 \cdot xH_2O$ (anhydrous) 798.85
L-Tyrosine, *O*-(4-hydroxy-3,5-diiodophenyl)-3,5-diiodo-, monosodium salt, hydrate;
Monosodium L-thyroxine hydrate [25416-65-3].
Anhydrous [55-03-8].

DEFINITION

Levothyroxine Sodium is the sodium salt of L-3,3′,5,5′-tetraiodothyronine. It contains NLT 97.0% and NMT 103.0% of $C_{15}H_{10}I_4NNaO_4$, calculated on the anhydrous basis.

IDENTIFICATION

- **A.**
  Sample: 50 mg
  Analysis: Ignite the *Sample* in a platinum dish over a flame.
  Acceptance criteria: It decomposes and liberates iodine vapors. [NOTE—Cool the residue, and reserve it for use in *Identification* test *D*.]
- **B.**
  Acid sodium chloride solution: Alcohol, 1 N sodium hydroxide, hydrochloric acid, and water (25:10:10:30)
  Sample: 0.5 mg
  Analysis: Add 7.5 mL of *Acid sodium chloride solution* and 1 mL of 10 mg/mL sodium nitrite solution to the *Sample*. Allow to stand in the dark for 20 min, and add 1.25 mL of ammonium hydroxide.
  Acceptance criteria: A pink color is produced.
- **C.** The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution,* as obtained in the *Assay*.
- **D. IDENTIFICATION TESTS—GENERAL,** *Sodium* ⟨**191**⟩**:** The solution meets the requirements of the flame test.
  Sample solution: To the residue retained from *Identification* test *A,* add a 1 N potassium hydroxide solution dropwise until the residue is dissolved.

ASSAY

- **PROCEDURE**
  Mobile phase: Acetonitrile and water (4:6) that contains 0.5 mL of phosphoric acid in each 1000 mL
  Solution A: 400 mg of sodium hydroxide in 500 mL of water. Cool and add 500 mL of methanol.
  Levothyroxine stock solution: 0.4 mg/mL of USP Levothyroxine RS in *Solution A*
  Liothyronine stock solution: 0.4 mg/mL of liothyronine from USP Liothyronine RS in *Solution A*. Make a 1:100 dilution of this solution using *Mobile phase*.
  Standard solution: 10 µg/mL of levothyroxine from *Levothyroxine stock solution* and 0.2 µg/mL of liothyronine from *Liothyronine stock solution*, in *Mobile phase*
  Sample solution: Prepare a solution of Levothyroxine Sodium in *Mobile phase* having a known concentration of 10 µg/mL. [NOTE—A small amount of 0.01 M methanolic sodium hydroxide can be used to facilitate the dissolution of the sample.]
  Chromatographic system
  (See *Chromatography* ⟨621⟩*, System Suitability*.)
  Mode: LC
  Detector: UV 225 nm
  Column: 4.6-mm × 25-cm; packing L10
  Flow rate: 1.5 mL/min
  Injection size: 100 µL
  System suitability
  Sample: *Standard solution*
  Suitability requirements
  Resolution: NLT 5.0 between liothyronine and levothyroxine
  Relative standard deviation: NMT 2.0% for levothyroxine
  Analysis
  Samples: *Standard solution* and *Sample solution*
  Calculate the percentage of levothyroxine sodium ($C_{15}H_{10}I_4NNaO_4$) in the portion of Levothyroxine Sodium taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (M_{r1}/M_{r2}) \times 100$$

r_U = peak response of levothyroxine from the *Sample solution*
r_S = peak response of levothyroxine from the *Standard solution*
C_S = concentration of USP Levothyroxine RS in the *Standard solution* (µg/mL)
C_U = concentration of Levothyroxine Sodium in the *Sample solution* (µg/mL)
M_{r1} = molecular weight of levothyroxine sodium, 798.85
M_{r2} = molecular weight of levothyroxine, 776.87

Acceptance criteria: 97.0%–103.0% on the anhydrous basis

IMPURITIES

[NOTE—On the basis of the synthetic route, perform either *Organic Impurities, Procedure 1* or *Organic Impurities, Procedure 2*. *Procedure 2* is recommended when related compounds listed in *Table 3* may be present.]

- **ORGANIC IMPURITIES,** *Procedure 1*
  Diluent: Acetonitrile and water (1:1)
  Solution A: Dilute 5 mL of phosphoric acid with *Diluent* to 100.0 mL.
  Mobile phase: Dissolve 1.0 g of sodium 1-heptanesulfonate in 200 mL of water. Add 200 mL of acetonitrile, 400 mL of methanol, and 1.0 mL of phosphoric acid. Dilute with water to 1 L.
  Standard stock solution 1: Transfer 25 mg of USP Levothyroxine RS to a 100-mL volumetric flask. Add 50 mL of *Diluent* and 1 drop of 10 N sodium hydroxide, and sonicate until dissolved. Add 7 mL of *Solution A*, and dilute with *Diluent* to volume.
  Standard stock solution 2: Transfer 25 mg of USP Liothyronine RS to a 100-mL volumetric flask. Add 50 mL of *Diluent* and 1 drop of 10 N sodium hydroxide, and sonicate until dissolved. Add 7 mL of *Solution A*, and dilute with *Diluent* to volume.
  System suitability solution: Transfer 5.0 mL of *Standard stock solution 1* and 5.0 mL of *Standard stock solution 2* to a 100-mL volumetric flask. Add 7 mL of *Solution A*, and dilute with *Diluent* to volume.
  Standard solution: Pipet 4.0 mL of the *System suitability solution* into a 100-mL volumetric flask. Add 7 mL of *Solution A*, and dilute with *Diluent* to volume.
  Blank solution: Transfer 7 mL of *Solution A* to a 100-mL volumetric flask, and dilute with *Diluent* to volume.
  Sample solution: Transfer 25 mg of Levothyroxine Sodium to a 100-mL volumetric flask. Add 50 mL of *Diluent*, and sonicate until dissolved. Add 7 mL of *Solution A*, and dilute with *Diluent* to volume.
  Chromatographic system
  (See *Chromatography* ⟨621⟩*, System Suitability*.)
  Mode: LC
  Detector: UV 225 nm
  Column: 4.6-mm × 15-cm; 5-µm packing L7
  Column temperature: 35°
  Flow rate: 1.5 mL/min
  Injection size: 15 µL
  System suitability
  Samples: *System suitability solution* and *Standard solution*
  Suitability requirements
  Resolution: NLT 5.0 between levothyroxine and liothyronine, *System suitability solution*
  Relative standard deviation: NMT 2.0% for the levothyroxine peak, *Standard solution*
  Analysis
  Samples: *Standard solution*, *Blank solution*, and *Sample solution*
  [NOTE—Record the chromatograms for at least six times the retention time of the levothyroxine peak. Verify that no peaks elute in the *Blank solution* at the expected retention times for levothyroxine and related compounds.]
  Calculate the area percentage of each related compound in the portion of Levothyroxine Sodium taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (M_{r1}/M_{r2}) \times 100$$

r_U = peak response of each impurity from the *Sample solution*
r_S = peak response of levothyroxine from the *Standard solution*
C_S = concentration of levothyroxine in the *Standard solution* (mg/mL)

C_U = concentration of Levothyroxine Sodium in the *Sample solution* (mg/mL)
M_{r1} = molecular weight of levothyroxine sodium, 798.85
M_{r2} = molecular weight of levothyroxine, 776.87

[NOTE—The relative response factor for the impurities listed in *Table 1* is 1.00. Any unspecified impurity peaks should be assigned a relative response factor of 1.00.]

Disregard peaks corresponding to those of the *Blank solution*, and disregard peaks corresponding to less than 0.03%.

Acceptance criteria: See *Table 1*.

Table 1

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Liothyronine	0.65–0.70	1.0
β-Hydroxy-T4[a]	0.71–0.76	0.15
Levothyroxine	1.0	—
T4-Hydroxyacetic acid[b]	1.13–1.28	0.15
N-Formyl-T4[c] and T4-acetamide[d]	1.47–1.53	0.15
N-Acetyl-T4[e]	1.50–1.86	0.20
T4-Acetic acid[f]	2.42–2.51	0.30
T4-Aldehyde[g]	3.17–3.45	0.15
T4-Benzoic acid[h]	3.46–3.70	0.15
Individual unspecified impurity	—	0.10
Total impurities	—	2.0

[a] *O*-(4-Hydroxy-3,5-diiodophenyl)-3,5-diiodo-β-hydroxy-L-tyrosine.
[b] 2-Hydroxy-2-(4-(4-hydroxy-3,5-diiodophenoxy)-3,5-diiodophenyl)acetic acid.
[c] *N*-Formyl-*O*-(4-hydroxy-3,5-diiodophenyl)-3,5-diiodo-L-tyrosine.
[d] 2-(4-(4-Hydroxy-3,5-diiodophenoxy)-3,5-diiodophenyl) acetamide.
[e] *N*-Acetyl-*O*-(4-hydroxy-3,5-diiodophenyl)-3,5-diiodo-L-tyrosine.
[f] 2-(4-(4-Hydroxy-3,5-diiodophenoxy)-3,5-diiodophenyl)acetic acid.
[g] 4-(4-Hydroxy-3,5-diiodophenoxy)-3,5-diiodobenzaldehyde.
[h] 4-(4-Hydroxy-3,5-diiodophenoxy)-3,5-diiodobenzoic acid.

• **ORGANIC IMPURITIES,** *Procedure 2*

Solution A: Dissolve 9.7 g of sulfamic acid in 2000 mL of water. Add 1.5 g of sodium hydroxide, mix to dissolve, and adjust with 2 N sodium hydroxide to a pH of 2.0.
Solution B: Acetonitrile
Diluent 1: Methanol and *Solution A* (90:10)
Diluent 2: Acetonitrile and *Solution A* (30:70); mix with *Diluent 1* (1:1).
Mobile phase: See *Table 2*.

Table 2

Time (min)	Solution A (%)	Solution B (%)
0	70	30
10	70	30
40	20	80
50	20	80
53	70	30
75	70	30

Blank solution: Use *Diluent 2*.
Standard stock solution: 0.1 mg/mL each of USP Levothyroxine RS and USP Liothyronine RS in *Diluent 1*
Standard solution: 0.002 mg/mL of USP Levothyroxine RS and USP Liothyronine RS, prepared using the *Standard stock solution* in *Diluent 2*
Sensitivity solution: 0.0002 mg/mL of USP Levothyroxine RS and USP Liothyronine RS, prepared using the *Standard solution* in *Diluent 2*
Identification solution: Dissolve 5.0 mg of USP Levothyroxine for Peak Identification RS in 4.5 mL of methanol. Add 0.5 mL of *Solution A*. Further dilute a portion of this solution with *Diluent 2* to obtain a solution containing about 0.2 mg/mL.
Sample solution: Dissolve an amount of Levothyroxine Sodium in *Diluent 1* to obtain a solution having a known concentration of about 1.0 mg/mL. Further dilute a portion of this solution with *Diluent 2* to obtain a solution having a known concentration of about 0.2 mg/mL.
Chromatographic system
(See *Chromatography* ⟨621⟩*, System Suitability*.)
Mode: LC
Detector: UV 225 nm
Column: 4.0-mm × 15-cm; 3-µm packing L1
Flow rate: 1.0 mL/min
Injection size: 25 µL
System suitability
Samples: *Standard solution* and *Sensitivity solution*
Suitability requirements
Resolution: NLT 5 between levothyroxine and liothyronine, *Standard solution*
Signal-to-noise ratio: NLT 5 for each peak from the *Sensitivity solution*, calculated as follows:

$$\text{Result} = (2H)/h$$

H = measured height of the peak
h = amplitude of the average measured baseline noise

Analysis
Samples: *Blank solution*, *Standard solution*, *Identification solution*, and *Sample solution*

[NOTE—Identify the components on the basis of their relative retention times as listed in *Table 3*.]

Calculate the percentage of liothyronine sodium in the portion of Levothyroxine Sodium taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (M_{r1}/M_{r2}) \times 100$$

r_U = peak response of liothyronine from the *Sample solution*
r_S = peak response of liothyronine from the *Standard solution*
C_S = concentration of liothyronine in the *Standard solution* (mg/mL)
C_U = concentration of Levothyroxine Sodium in the *Sample solution* (mg/mL)
M_{r1} = molecular weight of liothyronine sodium, 672.96
M_{r2} = molecular weight of liothyronine, 650.98

Calculate the percentage of any other impurity in the portion of Levothyroxine Sodium taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (M_{r1}/M_{r2}) \times 100$$

r_U = peak response of any impurity from the *Sample solution*
r_S = peak response of levothyroxine from the *Standard solution*
C_S = concentration of levothyroxine in the *Standard solution* (mg/mL)
C_U = concentration of Levothyroxine Sodium in the *Sample solution* (mg/mL)
M_{r1} = molecular weight of levothyroxine sodium, 798.85
M_{r2} = molecular weight of levothyroxine, 776.87

[NOTE—The relative response factor for the impurities listed in *Table 3* is 1.00. Any unspecified impurity peaks should be assigned a relative response factor of 1.00.]

Disregard peaks corresponding to those of the *Blank solution*, and disregard peaks corresponding to less than 0.03%.

Acceptance criteria: See *Table 3*.

Table 3

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Liothyronine	0.65	1.0
Monochlorotriiodothyronine[a]	0.94	0.15
Levothyroxine *N*-methylamide[b]	0.97	0.15
Levothyroxine	1.0	—
Triiodothyroacetic acid, or T3-acetic acid[c]	1.57	0.15
O-(4-Hydroxy-3,5-diiodophenyl)thyroxine, or T6[d]	1.61	0.50
O-Methyl-tetraiodothyroethylamine, or T4-amine *O*-methyl[e]	1.76	0.30
T4-Acetic acid[f]	1.79	0.30
Individual unspecified impurity	—	0.10
Total impurities	—	2.0

[a] (*S*)-2-Amino-3-[3-chloro-4-(4-hydroxy-3,5-diiodophenoxy)-5-iodophenyl] propanoic acid.
[b] (*S*)-2-Amino-3-[4-(4-hydroxy-3,5-diiodophenoxy)-3,5-diiodophenyl]-*N*-methylpropanamide.
[c] [4-(4-Hydroxy-3-iodophenoxy)-3,5-diiodophenyl]acetic acid.
[d] (*S*)-2-Amino-3-[4-[4-(4-hydroxy-3,5-diiodophenoxy)-3,5-diiodophenoxy]-3,5-diiodophenyl]propanoic acid.
[e] 2-[4-(3,5-Diiodo-4-methoxyphenoxy)-3,5-diiodophenyl]ethanamine.
[f] 2-(4-(4-Hydroxy-3,5-diiodophenoxy)-3,5-diiodophenyl)acetic acid.

SPECIFIC TESTS

- **OPTICAL ROTATION,** *Specific Rotation* ⟨**781S**⟩**:** –5° to –6°
  Sample solution: Equivalent to 30 mg/mL of anhydrous Levothyroxine Sodium in alcohol and 1 N sodium hydroxide (2:1)
- **WATER DETERMINATION,** *Method I* ⟨**921**⟩**:** NMT 11.0%

ADDITIONAL REQUIREMENTS

- **PACKAGING AND STORAGE:** Preserve in tight containers, protected from light. Store as stated in the labeling instructions.
- **LABELING:** If a test for *Organic Impurities* other than *Procedure 1* is used, the labeling states the test with which the article complies.
- **USP REFERENCE STANDARDS** ⟨**11**⟩
  USP Levothyroxine RS
  O-(4-hydroxy-3,5-diiodophenyl)-3,5-diiodo-L-tyrosine.
  $C_{15}H_{11}I_4NO_4$ 776.87
  USP Liothyronine RS
  O-(4-hydroxy-3-iodophenyl)-3,5-diiodo-L-tyrosine.
  $C_{15}H_{12}I_3NO_4$ 650.98
  USP Levothyroxine for Peak Identification RS
  Levothyroxine sodium spiked with liothyronine, triiodothyroacetic acid, tetraiodothyroacetic acid.

Levothyroxine Sodium Oral Powder

» Levothyroxine Sodium Oral Powder contains not less than 90.0 percent and not more than 110.0 percent of the labeled amount of levothyroxine sodium ($C_{15}H_{10}I_4NNaO_4$).

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

Labeling—Label it to indicate that it is for veterinary use only.

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

Identification—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*.

Loss on drying ⟨731⟩**—**Dry it in vacuum at 60° for 3 hours: it loses not more than 2.0% of its weight.

Assay—

Mobile phase—Prepare a filtered and degassed mixture of water and acetonitrile (65:35) that contains 1 mL of phosphoric acid in each 1000 mL. Make adjustments if necessary (see *System Suitability* under *Chromatography* ⟨621⟩).

0.01 M Methanolic sodium hydroxide—Dissolve 400 mg of sodium hydroxide in 500 mL of water. Cool, add 500 mL of methanol, and mix.

Standard preparation—Dissolve an accurately weighed quantity of USP Levothyroxine RS in *0.01 M Methanolic sodium hydroxide*, and dilute quantitatively and stepwise with *0.01 M Methanolic sodium hydroxide* to obtain a solution having a known concentration of about 4 µg per mL.

Assay preparation—Transfer an accurately weighed portion of Oral Powder, equivalent to about 5 mg of levothyroxine sodium, to a 250-mL volumetric flask. Dilute with *0.01 M Methanolic sodium hydroxide* to volume, mix, and allow to stand for 4 hours, with occasional mixing. Pass a portion of this mixture through a filter that does not absorb levothyroxine. Transfer 10.0 mL of the filtrate to a 50-mL volumetric flask, dilute with *0.01 M Methanolic sodium hydroxide* to volume, and mix.

Chromatographic system (see *Chromatography* ⟨621⟩)—The liquid chromatograph is equipped with a 225-nm detector and a 4.6-mm × 25-cm column that contains packing L10. The flow rate is about 1 mL per minute. Chromatograph the *Standard preparation*, and record the peak responses as directed for *Procedure:* the tailing factor is not more than 1.8; and the relative standard deviation for replicate injections is not more than 2.0%.

Procedure—Separately inject equal volumes (about 50 µL) of the *Standard preparation* and the *Assay preparation* into the chromatograph, record the chromatograms, and measure the responses for the major peaks. Calculate the quantity, in mg, of levothyroxine sodium ($C_{15}H_{10}I_4NNaO_4$) in the portion of Oral Powder taken by the formula:

$$(798.85 / 776.87)(1.25C)(r_U / r_S)$$

in which 798.85 and 776.87 are the molecular weights of levothyroxine sodium and levothyroxine, respectively; C is the concentration, in µg per mL, of USP Levothyroxine RS in the *Standard preparation;* and r_U and r_S are the peak responses obtained from the *Assay preparation* and the *Standard preparation*, respectively.

Levothyroxine Sodium Tablets

DEFINITION

Levothyroxine Sodium Tablets contain NLT 95.0% and NMT 105.0% of the labeled amount of levothyroxine sodium ($C_{15}H_{10}I_4NNaO_4$).

IDENTIFICATION

- The retention time of the major peak of the *Sample solution* corresponds to the levothyroxine peak of the *Standard solution,* as obtained in the *Assay.*

ASSAY

- **PROCEDURE**
  [NOTE—Use *Sample solution 2* for Tablets labeled to meet the requirements of *Dissolution Test 3.* For all other products, use the *Sample solution.*]