

## Gabapentin Tablets

» Gabapentin Tablets contain not less than 90.0 percent and not more than 110.0 percent of the labeled amount of gabapentin ( $C_9H_{17}NO_2$ ).

**Packaging and storage**—Preserve in well-closed containers. Store at controlled room temperature.

**USP Reference standards** (11)—*USP Gabapentin RS. USP Gabapentin Related Compound A RS.*

### Add the following:

■ **Labeling**—When more than one *Dissolution* test is given, the labeling states the *Dissolution* test used only if *Test 1* is not used. ■<sub>2S</sub> (USP32)

### Identification—

**A:** *Infrared Absorption* (197K).

*Test specimen*—Grind at least 20 Tablets to a fine powder. Use an amount of powder, equivalent to about 2 mg of gabapentin, and about 200 mg of dry potassium bromide.

**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*.

### Change to read:

### Dissolution (711)—

■ **TEST 1**—■<sub>2S</sub> (USP32)

*Medium:* 0.06 N hydrochloric acid (prepared by adding 51 mL of hydrochloric acid to 10 L of water); 900 mL.

*Apparatus 2:* 50 rpm.

*Time:* 45 minutes.

Determine the amount of gabapentin ( $C_9H_{17}NO_2$ ) dissolved by the following method.

*Mobile phase*—Proceed as directed in the *Assay*.

*Standard stock solution*—Dissolve an accurately weighed quantity of USP Gabapentin RS in *Medium* to obtain a final solution having a known concentration of about 1.1 mg per mL.

*Working standard solutions*—Dilute aliquots of the *Standard stock solution* with *Medium* to obtain solutions having the following concentrations: 110 µg per mL for Tablets labeled to contain 100 mg; 330 µg per mL for Tablets labeled to contain 300 mg; 440 µg per mL for Tablets labeled to contain 400 mg; 660 µg per mL for Tablets labeled to contain 600 mg; and 880 µg per mL for Tablets labeled to contain 800 mg.

*Test solution*—Pass a portion of the solution under test through a suitable 0.45-µm filter.

*Chromatographic system* (see *Chromatography* (621))—Proceed as directed in the *Assay*, except to use the *Working standard solutions*: the column efficiency is not less than 5000 theoretical plates; the tailing factor is not more than 2.0; and the relative standard deviation for replicate injections is not more than 3%.

*Procedure*—Separately inject equal volumes (about 100 µL for Tablets labeled to contain 100, 300, or 400 mg; and about 50 µL for Tablets labeled to contain 600 or 800 mg) of the appropriate *Working standard solution* and the *Test solution* into the chromatograph, record the chromatograms, and measure the peak responses. Calculate the amount of gabapentin ( $C_9H_{17}NO_2$ ) dissolved by the formula:

$$\frac{r_U \times C_S \times 900 \times 100}{r_S \times L}$$

in which  $r_U$  and  $r_S$  are the peak responses for the *Test solution* and the *Working standard solution*, respectively;  $C_S$  is the concentration, in mg per mL, of the *Working standard solution*; 900 is the volume, in mL, of *Medium*; 100 is the conversion factor to percentage; and  $L$  is the Tablet label claim, in mg.

*Tolerances*—Not less than 80% ( $Q$ ) of the labeled amount of gabapentin ( $C_9H_{17}NO_2$ ) is dissolved in 45 minutes.

■ **TEST 2**—If the product complies with this test, the labeling indicates that the product meets USP *Dissolution Test 2*.

*Medium, Apparatus 2, Mobile phase, Standard stock solution, Working standard solutions, Test solution, Chromatographic system, and Procedure*—Proceed as directed for *Test 1*.

*Time:* 30 minutes.

*Tolerances*—Not less than 80% (RB 1-Dec-2009) ( $Q$ ) of the labeled amount of gabapentin ( $C_9H_{17}NO_2$ ) is dissolved in 30 minutes. ■<sub>2S</sub> (USP32)

**Uniformity of dosage units** (905): meet the requirements.

### Related compounds—

*Diluent*—Prepare as directed in the *Assay*.

*Solution A*—Dissolve 1.2 g of monobasic potassium phosphate in 940 mL of water. Adjust with 5 N potassium hydroxide to a pH of 6.9, add 60 mL of acetonitrile, and stir. Filter, and degas.

*Solution B*—Dissolve 1.2 g of monobasic potassium phosphate in 700 mL of water. Adjust with 5 N potassium hydroxide to a pH of 6.9, add 300 mL of acetonitrile, and stir. Filter, and degas.

*Mobile phase*—Use variable mixtures of *Solution A* and *Solution B* as directed for *Chromatographic system*. Make adjustments if necessary (see *System Suitability* under *Chromatography* (621)).

*Standard solution*—Dissolve accurately weighed quantities of USP Gabapentin RS and USP Gabapentin Related Compound A RS in *Diluent* to obtain a solution having a known concentration of about 0.04 mg of each per mL.

*Test solution*—Weigh and finely powder not fewer than 20 Tablets. Transfer an accurately weighed portion of the powder, equivalent to about 500 mg of gabapentin, to a suitable volumetric flask, and dissolve the contents in *Diluent* with sonication, if necessary, for about 30 seconds. Dilute with *Diluent* to volume, and mix to obtain a final solution having a known concentration of about 20 mg per mL, based on the label claim.

*Chromatographic system* (see *Chromatography* (621))—The liquid chromatograph is equipped with a 210-nm detector and a 4.6-mm × 25-cm column that contains 5-µm packing L7. The flow rate is about 1.5 mL per minute. The chromatograph is programmed as follows.

Time (minutes)	Solution A (%)	Solution B (%)	Elution
0.0–4.0	100	0	isocratic
4.0–45.0	100→0	0→100	linear gradient
45.0–45.1	0→100	100→0	linear gradient
45.1–50.0	100	0	re-equilibration

Chromatograph the *Standard solution*, and record the peak responses as directed for *Procedure*: the tailing factor for the gabapentin peak is not more than 2.0; and the relative standard deviation for replicate injections for both gabapentin and gabapentin related compound A is not more than 5.0%.

*Procedure*—Separately inject a volume (about 50 µL) of the *Standard solution* and the *Test solution* into the chromatograph, record the chromatograms, and measure the peak responses. Calculate

## 2 Gabapentin

the percentage of gabapentin related compound A in the portion of Tablets taken by the formula:

$$100(C_S / C_T)(r_U / r_S)$$

in which  $C_S$  is the concentration, in mg per mL, of USP Gabapentin Related Compound A RS in the *Standard solution*;  $C_T$  is the concentration, in mg per mL, of gabapentin in the *Test solution*, based on the label claim; and  $r_U$  and  $r_S$  are the individual peak responses for gabapentin related compound A obtained from the *Test solution* and *Standard solution*, respectively: not more than 0.4% of gabapentin related compound A is found. Calculate the percentage of any other unspecified degradation product relative to gabapentin content in the portion of Tablets taken using the formula:

$$100(C_S / C_T)(r_i / r_S)$$

in which  $C_S$  is the concentration, in mg per mL, of USP Gabapentin RS in the *Standard solution*;  $C_T$  is the concentration, in mg per mL, of gabapentin in the *Test solution*, based on the label claim;  $r_i$  is the response for each unspecified impurity in the *Test solution*; and  $r_S$  is the peak response for gabapentin in the *Standard solution*: not more than 0.1% of any individual unspecified degradation product is found; and not more than 1.0% of total impurities is found.

### Assay—

*Diluent*—Dissolve 1.2 g of monobasic potassium phosphate in 1 L of water. Adjust with 5 N potassium hydroxide to a pH of 6.9.

*Mobile phase*—Dissolve 1.2 g of monobasic potassium phosphate in 940 mL of water. Adjust with 5 N potassium hydroxide to a pH of 6.9, add 60 mL of acetonitrile, and stir. Filter, and degas. Make adjustments if necessary (see *System Suitability* under *Chromatography* (621)).

*Standard preparation*—Dissolve an accurately weighed quantity of USP Gabapentin RS in *Diluent*, and dilute quantitatively, and

stepwise if necessary, with *Diluent* to obtain a solution having a known concentration of about 4.0 mg per mL.

*Assay preparation*—Weigh and finely powder not fewer than 20 Tablets. Transfer an accurately weighed portion of the powder, equivalent to about 100 mg of gabapentin, to a suitable volumetric flask, and dissolve the contents in *Diluent* with sonication, if necessary, for about 60 seconds. Dilute with *Diluent* to volume, and mix to obtain a final solution having a known concentration of about 4.0 mg per mL.

*Chromatographic system* (see *Chromatography* (621))—The liquid chromatograph is equipped with a 210-nm detector and a 4.6-mm × 25-cm column that contains 5-μm packing L7. The flow rate is about 1.2 mL per minute. Chromatograph the *Standard preparation*, and record the peak responses as directed for *Procedure*: the column efficiency is not less than 7,000 theoretical plates; the tailing factor is not more than 2.0; 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 gabapentin peak. Calculate the percentage of the labeled amount of gabapentin (C<sub>9</sub>H<sub>17</sub>NO<sub>2</sub>) in the portion of Tablets taken by the formula:

$$100(C_S / C_U)(r_U / r_S)$$

in which  $C_S$  is the concentration, in mg per mL, of USP Gabapentin RS in the *Standard preparation*;  $C_U$  is the concentration, in mg per mL, of gabapentin in the *Assay preparation*, based on the label claim; and  $r_U$  and  $r_S$  are the peak responses obtained from the *Assay preparation* and the *Standard preparation*, respectively.