Analysis: Proceed as directed in the *Assay*, using the *Standard solution* and *Sample solution* prepared within the *Dissolution* test.

Calculate the percentages of the labeled amounts of acetaminophen ($C_8H_9NO_2$) and caffeine ($C_8H_{10}N_4O_2$) dissolved:

$$\text{Result} = (R_U/R_S) \times (C_S/C_U) \times 100$$

R_U = peak response ratio of acetaminophen or caffeine to the internal standard from the *Sample solution*

R_S = peak response ratio of acetaminophen or caffeine to the internal standard from the *Standard solution*

C_S = concentration of USP Acetaminophen RS or USP Caffeine RS in the *Standard solution* (mg/mL)

C_U = nominal concentration of acetaminophen or caffeine in the *Sample solution* (mg/mL)

Tolerances: NLT 75% (*Q*) of the labeled amounts of acetaminophen ($C_8H_9NO_2$) and caffeine ($C_8H_{10}N_4O_2$) is dissolved.

- **Uniformity of Dosage Units ⟨905⟩:** Meet the requirements

IMPURITIES

- **4-Aminophenol in Acetaminophen-Containing Drug Products ⟨227⟩:** Meet the requirements

ADDITIONAL REQUIREMENTS

- **Packaging and Storage:** Preserve in tight containers, and store at controlled room temperature.
- **USP Reference Standards ⟨11⟩**
  USP Acetaminophen RS
  USP Caffeine RS

Capsules Containing at Least Three of the Following—Acetaminophen and Salts of Chlorpheniramine, Dextromethorphan, and Pseudoephedrine

» Capsules Containing at Least Three of the Following—Acetaminophen and Salts of Chlorpheniramine, Dextromethorphan, and Pseudoephedrine contain not less than 90.0 percent and not more than 110.0 percent of the labeled amounts of acetaminophen ($C_8H_9NO_2$), chlorpheniramine maleate ($C_{16}H_{19}ClN_2 \cdot C_4H_4O_4$), dextromethorphan hydrobromide ($C_{18}H_{25}NO \cdot HBr \cdot H_2O$), and pseudoephedrine hydrochloride ($C_{10}H_{15}NO \cdot HCl$) or pseudoephedrine sulfate [$(C_{10}H_{15}NO)_2 \cdot H_2SO_4$]. [NOTE—The heading of this monograph does not constitute the official title. It is not intended that the name described herein be recognized as the official title or the common or usual name. The name for each article encompassed by this monograph shall be composed of the names of the active ingredients contained therein, as well as the quantitative amount of each active ingredient, and a statement of the function (or purpose) of the ingredient in the article.]

Packaging and storage—Preserve in tight containers, and store at controlled room temperature.

USP Reference standards ⟨11⟩—
USP Acetaminophen RS
USP Chlorpheniramine Maleate RS
USP Dextromethorphan Hydrobromide RS
USP Pseudoephedrine Hydrochloride RS
USP Pseudoephedrine Sulfate RS

Labeling—The label for each article encompassed by this monograph bears a name composed of the active ingredients contained in the article. The label states the name and quantity of each active ingredient and indicates its function (or purpose) in the article.

Identification—

A: If pseudoephedrine hydrochloride or pseudoephedrine sulfate is purported to be present, the retention time of the major peak for pseudoephedrine in the chromatogram of the *Assay preparation* corresponds to that in the chromatogram of the *Standard preparation*, as obtained in the *Assay for pseudoephedrine hydrochloride* or the *Assay for pseudoephedrine sulfate*.

B: If acetaminophen is claimed in the labeling to be present, the retention time of the major peak for acetaminophen in the chromatogram of the *Assay preparation* corresponds to that in the chromatogram of the *Standard preparation*, as obtained in the *Assay for acetaminophen*.

C: If chlorpheniramine maleate is claimed in the labeling to be present, the retention time of the major peak for chlorpheniramine in the chromatogram of the *Assay preparation* corresponds to that in the chromatogram of the *Standard preparation*, as obtained in the *Assay for chlorpheniramine maleate*.

D: If dextromethorphan hydrobromide is claimed in the labeling to be present, the retention time of the major peak for dextromethorphan in the chromatogram of the *Assay preparation* corresponds to that in the chromatogram of the *Standard preparation*, as obtained in the *Assay for dextromethorphan hydrobromide*.

Dissolution, *Procedure for a Pooled Sample* ⟨711⟩—

Medium: water; 900 mL.

Apparatus 1: 100 rpm.

Time: 45 minutes.

Test preparation—Mix 9.0 mL of a filtered portion of the solution under test with 1.0 mL of 1% phosphoric acid solution.

Procedure—Determine the amounts of pseudoephedrine hydrochloride or pseudoephedrine sulfate (as appropriate), acetaminophen, chlorpheniramine maleate, and dextromethorphan hydrobromide dissolved, employing the procedures set forth in the *Assay for pseudoephedrine hydrochloride* or *Assay for pseudoephedrine sulfate, Assay for acetaminophen, Assay for chlorpheniramine maleate,* and *Assay for dextromethorphan hydrobromide,* respectively, making any necessary volumetric adjustments.

Tolerances—Not less than 75% *(Q)* of the labeled amounts of pseudoephedrine hydrochloride ($C_{10}H_{15}NO \cdot HCl$) or pseudoephedrine sulfate [$(C_{10}H_{15}NO)_2 \cdot H_2SO_4$], acetaminophen ($C_8H_9NO_2$), chlorpheniramine maleate ($C_{16}H_{19}ClN_2 \cdot C_4H_4O_4$), and dextromethorphan hydrobromide ($C_{18}H_{25}NO \cdot HBr \cdot H_2O$) are dissolved in 45 minutes.

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

Assay for pseudoephedrine hydrochloride (where pseudoephedrine hydrochloride is the salt form used, if present in the formulation)—

Mobile phase, Standard preparation, and *Chromatographic system*—Proceed as directed in the *Assay for pseudoephedrine hydrochloride* under *Tablets Containing at Least Three of the Following—Acetaminophen and Salts of Chlorpheniramine, Dextromethorphan, and Pseudoephedrine.*

Chlorpheniramine standard preparation—Prepare as directed for *Standard preparation* in the *Assay for chlorpheniramine maleate.*