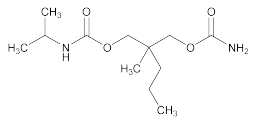
of the aluminum salt) that has been filtered and adjusted with 0.25 N sodium hydroxide to a pH of 1.5
Acceptance criteria: –21.0° to –23.5°, calculated as the monohydrate
• **LOSS ON DRYING** ⟨**731**⟩
Analysis: Heat 1 g in a suitable vacuum drying apparatus at 100° and a pressure of NMT 5 mm of mercury to constant weight. Cool, and weigh.
Acceptance criteria: 6.9%–7.9%

ADDITIONAL REQUIREMENTS
• **PACKAGING AND STORAGE:** Preserve in well-closed, light-resistant containers.

Change to read:

• **USP REFERENCE STANDARDS** ⟨**11**⟩
USP Carbidopa RS
●
● (RB 1-Feb-2012)
USP Methyldopa RS

Carisoprodol



$C_{12}H_{24}N_2O_4$ 260.33
(±)-2-Methyl-2-propyl-1,3-propanediol carbamate isopropylcarbamate [78-44-4].

DEFINITION
Carisoprodol contains NLT 98.0% and NMT 102.0% of $C_{12}H_{24}N_2O_4$, calculated on the dried basis.

IDENTIFICATION
• **A. INFRARED ABSORPTION** ⟨**197K**⟩

Change to read:

• **B.** ■The retention time of the major peak in the *Sample solution* corresponds to that in the *Standard solution* as obtained in the *Assay*.■2S (*USP35*)

ASSAY

Change to read:

• **PROCEDURE**
■**Diluent:** Acetonitrile and water (50:50)
Solution A: Acetonitrile and water (25:75)
Solution B: Acetonitrile
Mobile phase: See *Table 1*.

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	100	0
35	100	0
36	80	20
51	80	20
52	100	0
60	100	0

System suitability solution: 0.125 mg/mL each of USP Carisoprodol Related Compound A RS, USP Meprobamate RS, and USP Carisorprodol RS in *Diluent*
Standard solution: 2.5 mg/mL of USP Carisoprodol RS in *Diluent*
Sample solution: 2.5 mg/mL of Carisoprodol in *Diluent*
Chromatographic system
(See *Chromatography* ⟨621⟩, *System Suitability*.)
Mode: LC
Detector: UV 200 nm
Column: 4.6-mm × 15-cm; 4-µm packing L1
Column temperature: 30°
Flow rate: 1.5 mL/min
Injection size: 25 µL
System suitability
Samples: *System suitability solution* and *Standard solution*
[NOTE—See *Table 2* for the relative retention times.]
Suitability requirements
Resolution: NLT 1.5 between carisoprodol related compound A and meprobamate, *System suitability solution*
Tailing factor: NMT 2.5 for the carisoprodol peak, *Standard solution*
Relative standard deviation: NMT 2.0% for the carisoprodol peak, *Standard solution*
Analysis
Samples: *Standard solution* and *Sample solution*
Calculate the percentage of carisoprodol ($C_{12}H_{24}N_2O_4$) in the portion of the sample taken:

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

r_U = peak response of carisoprodol from the *Sample solution*
r_S = peak response of carisoprodol from the *Standard solution*
C_S = concentration of USP Carisoprodol RS in the *Standard solution* (mg/mL)
C_U = concentration of Carisoprodol in the *Sample solution* (mg/mL)■2S (*USP35*)
Acceptance criteria: 98.0%–102.0% on the dried basis

IMPURITIES

Add the following:

■• **RESIDUE ON IGNITION** ⟨**281**⟩**:** NMT 0.1%■2S (*USP35*)
• **HEAVY METALS,** *Method II* ⟨**231**⟩**:** NMT 10 ppm

Delete the following:

■**Organic Impurities**
• **PROCEDURE: LIMIT OF MEPROBAMATE**
Standard solution: 1 mg/mL of USP Meprobamate RS in chloroform
Sample solution: 100 mg/mL of Carisoprodol in chloroform
Chromatographic system
(See *Chromatography* ⟨621⟩, *Thin-Layer Chromatography*.)
Mode: TLC
Adsorbent: 0.25-mm layer of chromatographic silica gel
Application volume: 10 µL for *Sample solution* and 5 µL for *Standard solution*
Developing solvent system: Chloroform and acetone (4:1)
Spray reagent 1: 3 in 100 solution of furfural in chloroform

Spray reagent 2: Antimony trichloride TS

Analysis

Samples: *Standard solution* and *Sample solution*

Proceed as directed in the chapter. Allow the spots to dry in a current of air, and develop the chromatogram in the *Developing solvent system* until the solvent front has moved three-fourths of the length of the plate. Remove the plate from the developing chamber, mark the solvent front, allow the solvent to evaporate, and spray the plate alternately with *Spray reagent 1* and *Spray reagent 2* until one or more black spots appear, heat the plate at 110° for 15 min, and examine the plate.

Acceptance criteria: Any spot in the *Sample solution* having an R_F value corresponding to that of meprobamate in the *Standard solution* is not darker in color than the meprobamate spot in the *Standard solution* (NMT 0.5%).■2S *(USP35)*

Add the following:

■• **ORGANIC IMPURITIES**

Diluent, Mobile phase, System suitability solution, and **Chromatographic system:** Proceed as directed in the *Assay*.

Standard solution: 10 µg/mL of USP Carisoprodol RS in *Diluent*

Sample solution: 50 mg/mL of Carisoprodol in *Diluent*. [NOTE—Sonication may be used to aid dissolution.]

System suitability

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

[NOTE—See *Table 2* for the relative retention times.]

Suitability requirements

Resolution: NLT 1.5 between carisoprodol related compound A and meprobamate, *System suitability solution*

Tailing factor: NMT 2.5 for the carisoprodol peak, *Standard solution*

Relative standard deviation: NMT 5.0% for the carisoprodol peak, 3 replicate injections of *Standard solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Identify the specified impurities using the relative retention times given in *Table 2*.

Calculate the percentage of each impurity in the portion of Carisoprodol taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (1/F) \times 100$$

r_U = peak response of the impurity from the *Sample solution*

r_S = peak response of carisoprodol from the *Standard solution*

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

C_U = concentration of Carisoprodol in the *Sample solution* (mg/mL)

F = relative response factor (see *Table 2*)

Acceptance criteria: See *Table 2*.

Table 2

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Carisoprdol related compound A[a]	0.19	0.06	0.1
Meprobamate	0.24	0.08	0.5
Carisoprodol monocarbamate[b]	0.86	1.4	0.1
Carisoprodol	1.0	—	—
Any other unknown individual impurity	—	1.0	0.1
Total impurities	—	—	1.0

[a] 2-Hydroxymethyl-2-methylpentyl carbamate.

[b] *N*-Isopropyl-2-hydroxymethyl-2-methylpentyl carbamate.

Table 2 *(Continued)*

■2S *(USP35)*

SPECIFIC TESTS

Delete the following:

■• **MELTING RANGE OR TEMPERATURE,** *Class I* ⟨**741**⟩**:** 91°–94°■2S *(USP35)*

• **LOSS ON DRYING** ⟨**731**⟩**:** Dry a sample in vacuum at 60° for 3 h: it loses NMT 0.5% of its weight.

ADDITIONAL REQUIREMENTS

Change to read:

• **PACKAGING AND STORAGE:** Preserve in tight containers ■at room temperature.■2S *(USP35)*

Change to read:

• **USP REFERENCE STANDARDS** ⟨**11**⟩

USP Carisoprodol RS

■USP Carisoprodol Related Compound A RS

2-Hydroxymethyl-2-methylpentyl carbamate.

$C_8H_{17}NO_3$ 175.23■2S *(USP35)*

USP Meprobamate RS

Carisoprodol Tablets

DEFINITION

Carisoprodol Tablets contain NLT 90.0% and NMT 110.0% of the labeled amount of carisoprodol ($C_{12}H_{24}N_2O_4$).

IDENTIFICATION

• **A.** The retention time of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.

ASSAY

Change to read:

• **PROCEDURE**

■**Diluent:** Acetonitrile and water (50:50)

Mobile phase: Acetonitrile and water (25:75)

System suitability solution: 0.1 mg/mL each of USP Carisoprodol Related Compound A RS, USP Meprobamate RS, and USP Carisoprodol RS in *Diluent*

Standard solution: 2.5 mg/mL of USP Carisoprodol RS in *Diluent*

Sample solution: Nominally 2.5 mg/mL in *Diluent* prepared as follows. Transfer an amount equivalent to the label claim of carisoprodol from powdered Tablets (NLT 20) to a suitable volumetric flask, and fill 50% of the