water. Centrifuge the solution to expel any entrapped air. If any foam is present, remove with a spatula.

Analysis: Determine the viscosity in a suitable viscosimeter of the Ubbelohde type as directed under *Viscosity* ⟨911⟩.

Acceptance criteria: 80%–120% of the viscosity stated on the label

For hypromellose samples having a viscosity type of 600 mPa · s or higher

Sample solution: Transfer a quantity of Hypromellose equivalent to 10 g of solids, calculated on the dried basis, to a tared, wide-mouth centrifuge bottle, and add hot water to obtain a total weight of the sample and water of 500.0 g. Capping the bottle, stir by mechanical means at 400 ± 50 rpm for 10–20 min until the particles are thoroughly dispersed and wetted out. Scrape down the walls of the bottle with a spatula, if necessary, to ensure that there is no undissolved material on the sides of the bottle, and continue the stirring in a cooling water bath equilibrated at a temperature below 10 ° for another 20–40 min. Adjust the solution weight if necessary to 500.0 g, using cold water. Centrifuge the solution, if necessary, to expel any entrapped air. If any foam is present, remove with a spatula.

Analysis: Equip a suitable single-cylinder type rotational viscosimeter (Brookfield type LV Model, or equivalent), and determine the viscosity of this solution at 20 ± 0.1° under the operating conditions specified in the table below.

Labeled Viscosity[a] (mPa·s)	Rotor No.	Revolution (rpm)	Calculation Multiplier
600 or more and less than 1400	3	60	20
1400 or more and less than 3500	3	12	100
3500 or more and less than 9500	4	60	100
9500 or more and less than 99,500	4	6	1000
99,500 or more	4	3	2000

[a] The *Labeled Viscosity* is based on the manufacturer's specifications.

Allow the spindle to rotate for 2 min before taking the measurement. Allow a rest period of 2 min between subsequent measurements. Repeat the operation twice to rotate the spindle as specified above, and average the three readings.

Acceptance criteria: 75%–140% of the viscosity stated on the label

ADDITIONAL REQUIREMENTS

- **PACKAGING AND STORAGE:** Preserve in well-closed containers. No storage requirements are specified.
- **LABELING:** Label it to indicate its substitution type and its nominal viscosity value in millipascals per second (mPa · s).

Hypromellose Ophthalmic Solution

» Hypromellose Ophthalmic Solution is a sterile solution of Hypromellose. It contains not less than 85.0 percent and not more than 115.0 percent of the labeled amount of Hypromellose (hydroxypropyl methylcellulose). It may contain suitable antimicrobial, buffering, and stabilizing agents.

Packaging and storage—Preserve in tight containers.

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

Identification—

A: Pour a few mL of Ophthalmic Solution onto a glass plate, and allow the water to evaporate: a thin, self-sustaining film results.

B: Heat 5 mL of Ophthalmic Solution in a test tube over a low flame: the warm solution turns cloudy but clears upon chilling.

Sterility ⟨71⟩**:** meets the requirements.

pH ⟨791⟩**:** between 6.0 and 7.8.

Assay—

Standard preparation—Dissolve a suitable quantity of USP Hypromellose RS, accurately weighed, in water, and dilute quantitatively with water to obtain a solution having a known concentration of about 100 µg per mL.

Assay preparation—Dilute an accurately measured volume of Ophthalmic Solution quantitatively with water to obtain a solution having an equivalent concentration of about 100 µg of hypromellose per mL.

Procedure—Pipet 2 mL each of the *Standard preparation,* the *Assay preparation,* and water to provide a blank, into separate, glass-stoppered test tubes. To each tube add 5.0 mL of diphenylamine solution (prepared by dissolving 3.75 g of colorless diphenylamine crystals in 150 mL of glacial acetic acid and diluting the solution with 90 mL of hydrochloric acid), mix, and immediately insert the tubes into an oil bath at 105 ° to 110° for 30 minutes, the temperature being kept uniform within 0.1 ° during heating. Remove the tubes, and place them in an ice-water bath for 10 minutes or until thoroughly cool. At room temperature and using a suitable spectrophotometer, concomitantly determine the absorbances of the solutions from the *Standard preparation* and the *Assay preparation* at 635 nm, using the water solution as the blank. Calculate the quantity, in mg, of hypromellose in each mL of the Ophthalmic Solution taken by the formula:

$$0.001\,Cd(A_U / A_S)$$

in which C is the concentration, in µg per mL, of USP Hypromellose RS in the *Standard preparation;* d is the dilution factor used to obtain the *Assay preparation;* and A_U and A_S are the absorbances of the solutions from the *Assay preparation* and the *Standard preparation,* respectively.

Official from May 1, 2012
Copyright (c) 2011 The United States Pharmacopeial Convention. All rights reserved.