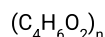
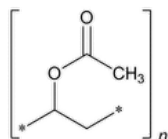


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Polyvinyl Acetate



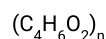
Vinyl acetate homopolymer

Vinyl acetate resin

CAS RN[®]: 9003-20-7.

DEFINITION

Polyvinyl acetate is a thermoplastic polymer, represented by the formula:



in which the value of n lies between approximately 100 and 17,000.

IDENTIFICATION

• A. PROCEDURE

Sample: 100 mg of Polyvinyl Acetate

Analysis: Dissolve the *Sample* in 2.5 mL of acetone, place two drops on a potassium bromide plate, and dry to evaporate the solvent.

Acceptance criteria: The IR absorption spectrum of polyvinyl acetate exhibits maxima corresponding to the same wavelengths as that of a similar preparation of [USP Polyvinyl Acetate RS](#), treated in the same manner.

• B. PROCEDURE

Sample: 0.5 g of Polyvinyl Acetate

Analysis: Saponify the *Sample* in a mixture of 25.0 mL of 0.5 N alcoholic potassium hydroxide and 25.0 mL of water.

Acceptance criteria: The solution so obtained meets the requirements of the tests for [Identification Tests—General \(191\), Acetate](#).

IMPURITIES

Inorganic Impurities

- [RESIDUE ON IGNITION \(281\)](#): NMT 0.1%

• RESIDUAL PEROXIDES

Sample: 0.85 g of Polyvinyl Acetate

Analysis: Place the *Sample* in a borosilicate glass flask with a ground-glass neck. Add 10.0 mL of ethyl acetate, and heat under a reflux condenser with constant agitation. Allow to cool. Replace the air in the container with oxygen-free nitrogen, and add a solution of 1.0 mL of glacial acetic acid and 0.5 g of sodium iodide in 40.0 mL of water. Shake thoroughly, and allow to stand protected from light for 20 min. Titrate with 0.005 N sodium thiosulfate VS until the yellow color is discharged. Perform a blank titration.

Acceptance criteria: The difference between the titration volumes is not greater than 1.0 mL; and NMT 100 ppm, calculated as hydrogen peroxide, is found.

Organic Impurities

• PROCEDURE: LIMIT OF VINYL ACETATE

Standard stock solution: 1.0 mg/mL of Vinyl Acetate in toluene

Standard solutions: 0.1, 0.3, 1, 3, and 10 µg/mL of vinyl acetate in toluene, prepared from *Standard stock solution*

Sample solution: 0.1 g/mL of Polyvinyl Acetate in toluene

Chromatographic system

(See [Chromatography \(621\), System Suitability](#).)

Mode: GC

Detector: Hydrogen flame ionization

Column: 0.32-mm × 30-m fused-silica capillary column, 5-μm layer of phase G1

Temperature

Detector: 250°

Injector port: 150°

Column: See the temperature program table below.

Initial Temperature (°)	Temperature Ramp (°/min)	Final Temperature (°)	Hold Time at Final Temperature (min)
100	—	100	8
100	20	250	5

Carrier gas: Helium

Flow rate: Adjusted so that the vinyl acetate peak appears after about 7 min

Injection size: 1.0 μL

Injection type: Split ratio is about 8:1.

System suitability

Sample: *Standard solution* containing 1 μg/mL of vinyl acetate in toluene

Suitability requirements

Relative standard deviation: NMT 15%

Analysis

Samples: *Standard solution* and *Sample solution*

Plot the peak responses of the vinyl acetate in the *Standard solutions* versus the concentration, in μg/mL, of vinyl acetate, and draw the straight line best fitting the five plotted points. From the graph so obtained, determine the concentration, C, in μg/mL, of vinyl acetate in the *Sample solution*.

Calculate the quantity, in μg, of vinyl acetate in each g of Polyvinyl Acetate taken:

$$\text{Result} = (C/C_p)$$

C = as determined above

C_p = concentration of the Polyvinyl Acetate in the *Sample solution* (g/mL)

Acceptance criteria: NMT 5 μg/g (5 ppm) of vinyl acetate

SPECIFIC TESTS

• [FATS AND FIXED OILS, Acid Value \(401\)](#)

Sample: 10.0 g of Polyvinyl Acetate

Analysis: Transfer the *Sample* to a 250-mL glass-stoppered conical flask, dissolve in 75 mL of ethylene dichloride, add 60 mL of denatured alcoholic TS, and mix. Add 1 mL of phenolphthalein TS, and titrate with 0.02 N alcoholic potassium hydroxide VS until the solution remains faintly pink after shaking for 30 s. Perform a blank determination, and make any necessary correction.

Acceptance criteria: The acid value is NMT 0.5.

• [FATS AND FIXED OILS, Ester Value \(401\)](#)

Sample: 0.5 g of Polyvinyl Acetate

Analysis: Saponify the *Sample* in a mixture of 25.0 mL of 0.5 N alcoholic potassium hydroxide VS and 25.0 mL of water. Proceed as directed under [Fats and Fixed Oils \(401\)](#), [Saponification Value](#), beginning with "Heat the flask on a steam bath".

Acceptance criteria: The ester value, calculated from the *Saponification Value* and the *Acid Value*, is between 615 and 675.

• [LOSS ON DRYING \(731\)](#): Dry 1.5 g at 100° for 2 h in a vacuum: it loses NMT 1.0% of its weight.

• **AVERAGE MOLECULAR WEIGHT AND MOLECULAR WEIGHT DISTRIBUTION**

[CAUTION—Tetrahydrofuran (THF) is considered to be a carcinogen and embryo-fetal toxic substance. It is also a peroxide former and is flammable. A safe-handling practice must be in place in the laboratory. Carefully review appropriate Material Safety Data Sheet before use.]