Ethylene Vinyl Acetate

1 Nonproprietary Names

None adopted.

2 Synonyms

Acetic acid, ethylene ester polymer with ethane; *CoTran*; ethylene/vinyl acetate copolymer; EVA; EVA copolymer; EVM; poly(ethylene-*co*-vinyl acetate); VA/ethylene copolymer; vinyl acetate/ethylene copolymer.

3 Chemical Name and CAS Registry Number

Ethylene vinyl acetate copolymer [24937-78-8]

4 Empirical Formula and Molecular Weight

$(CH_2CH_2)_x[CH_2CH(CO_2CH_3)]_y$

See Section 5.

5 Structural Formula

Ethylene vinyl acetate copolymer is a random copolymer of ethylene and vinyl acetate.

6 Functional Category

Transdermal delivery component.

7 Applications in Pharmaceutical Formulation or Technology

Ethylene vinyl acetate copolymers are used as membranes and backings in laminated transdermal drug delivery systems. They can also be incorporated as components in backings in transdermal systems. Ethylene vinyl acetate copolymers have been shown to be an effective matrix and membrane for the controlled delivery.[1–11] The system for controlled release of atenolol can be further developed using ethylene vinyl acetate copolymers and plasticizers.[1]

8 Description

Ethylene vinyl acetate copolymers occur as odorless white waxy solids in pellet or powder form. Films are translucent.

9 Pharmacopeial Specifications

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10 Typical Properties

Density 0.92–0.94 g/cm^3
Flash point 260°C
Melting point 75–102°C depending on polymer ratios.
Moisture vapor transmission rate *see* Table I.
Solubility Insoluble in water
Thickness *see* Table I.
Vinyl acetate content *see* Table I.

11 Stability and Storage Conditions

Ethylene vinyl acetate copolymers are stable under normal conditions and should be stored in a cool, dry, well-ventilated area. Films of ethylene vinyl acetate copolymers should be stored at 0–30°C and less than 75% relative humidity.

Table I: Characteristics of different *CoTran* (3M Drug Delivery Systems) film grades.

Grade	Thickness (μm)	Vinyl acetate (%)	Moisture vapor transmission rate (g/m^2/24 h)
CoTran 9702	50.8	9	52.8
CoTran 9705	76.2	9	35.2
CoTran 9706	101.6	9	26.4
CoTran 9707	50.8	4.5	15.7
CoTran 9712	50.8	18.5	97.2
CoTran 9715	76.2	18.5	64.8
CoTran 9716	101.6	18.5	48.6
CoTran 9728	50.8	18.5	97.2

12 Incompatibilities

Ethylene vinyl acetate is incompatible with strong oxidizing agents and bases.

13 Method of Manufacture

Various molecular weights of random ethylene vinyl acetate copolymers can be obtained by catalytic copolymerization of ethylene and vinyl acetate, high-pressure radical polymerization, bulk continuous polymerization, or solution polymerization. Film membranes of ethylene vinyl acetate copolymers are manufactured using a melt-cast process.

14 Safety

Ethylene vinyl acetate is mainly used in topical pharmaceutical applications as a membrane or film backing. Generally it is regarded as a relatively nontoxic and nonirritant excipient.

15 Handling Precautions

Observe normal precautions appropriate to the circumstances and quantity of material handled. Ethylene vinyl acetate powder may form an explosive mixture with air.

16 Regulatory Status

Included in the FDA Inactive Ingredients Database (subcutaneous rod; intrauterine suppository; ophthalmic preparations; periodontal film; transdermal film). Included in nonparenteral medicines licensed in the UK.

17 Related Substances

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18 Comments

Ethylene vinyl acetate copolymers have a wide variety of industrial uses. Properties of ethylene vinyl acetate copolymer films in terms of oxygen and moisture transfer rate are related to the vinyl acetate content and thickness. Higher levels of vinyl acetate result in increased lipophilicity, increased oxygen and moisture vapor permeability, and increased clarity, flexibility, toughness, and solvent solubility.

The PubChem Compound ID (CID) for ethylene vinyl acetate is 32742.