

Product Forms

Aquatrix II hydrogels are available as two aqueous solutions. Part A is comprised of water and PVP. Part B contains water, preservative, and either Chitosan or Polyethyleneimine. Mixing the two solutions results in the formation of the hydrogel. Hydromer can also supply finished products and offers in-house formulation, coating and prototyping services to speed your time to market.

INCI NAME:

PVP/Chitosan
PVP/Polyethyleneimine

TOXICOLOGY:

The toxicological studies have shown that resulting hydrogel are non-toxic and non-irritating to skin. Japanese MHW approved.

HANDLING & SAFETY:

Material Safety Data Sheets are available upon request from Hydromer Inc.

AVAILABILITY:

Products may be ordered from Hydromer Inc., 35 Industrial Parkway, Branchburg, NJ 08876, or from authorized Hydromer Inc. distributors.



FURTHER INFORMATION:

For further information contact:
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U.S. Patents: 5,420,197, 5,306,504, 5,645,855 and corresponding foreign patents



AQUATRIX II™

hydrogels



Cosmetics

Moisturizers

Skin Treatments

Patches & Masks

Drug Delivery

Wound/Burn Care

Hair Care

Exfoliants



Formulary

Product Description

Aquatrix II is a family of patented, hydrophilic polymer gels developed by Hydromer Inc. The Aquatrix II hydrogels are based on combinations of Polyvinylpyrrolidone (PVP) with either Chitosan or Polyethyleneimine (PEI). The PVP binds with the Chitosan or PEI to form a hydrogel having a three-dimensional structure that results in superior cohesive and elastic properties. The gel formation requires no irradiation, so active ingredients that are light and or heat sensitive can easily be formulated into the finished gel without loss of activity or therapeutic value. Aquatrix II hydrogels can be molded into shapes to fit an existing product design, used as film-formers to create thin, flexible films, or be coated onto a substrate and laminated. The finished gels have absorbent properties and can absorb water or saline to become lubricious. They can also be used to stabilize emulsions and, in the Chitosan formulations, add the conditioning and therapeutic benefits of Chitosan to the finished product.

Applications

- Eye patches / Face masks
- Moisturizers, Shampoos, Conditioners, Styling products
- Wound and Burn care treatments
- Exfoliants
- Gelling agent / Viscosity modifier / Emulsion stabilizer
- Transdermal Drug Delivery vehicles

Product Benefits

- Compatible with a broad range of cosmetic and drug ingredients
- Excellent moisturizing properties
- Smooth, silky, non-greasy, residue-free feeling on the skin
- Moisture barrier / Cooling / Soothing
- Imparts soothing and enhances healing of dry and damaged skin
- Improve conditioning performance of shampoos and conditioners

Performance Characteristics

Aquatrix II hydrogels are manufactured as two separate, water-based solutions, one containing PVP and one containing Chitosan or Polyethyleneimine. The solutions are mixed together and the gel forms over a period of time ranging from a few seconds to a few minutes, depending on formulation. Aquatrix II hydrogels can accept a wide range of active ingredients soluble in water, glycerol, or glycol. Ingredients that are soluble in alcohol or oil may also be used with slight formulation modifications. Active ingredients can be incorporated into the formulation prior to forming the gel, so that they will be evenly dispersed in the gel matrix and released over time. The gel formulations are versatile and their physical properties can be modified to suit a variety of applications. Physical properties that are typically modified for customers are tack level, gel strength, and gel time. The tack level changes between formulations, and can be increased or decreased to suit a particular application. Aquatrix II hydrogels are often used as bioadhesives, since they can be applied to and removed from the skin without irritation or residue. The unique chemistry of the Aquatrix II hydrogels allow them to be processed in many ways, such as molding the gel into a shape or applying it between films as a laminate. Examples of uses for laminated are as facial masks for delivering cosmetic actives or sports wraps to reduce swelling. Aquatrix II hydrogels are viscoelastic materials, and gel strengths are different for each formulation. Higher % solids formulations yield stiffer, more elastic gels, while varying the ratio of PVP to Chitosan or PEI changes the gel strength and gel time.

Effect of PVP: Chitosan Ratio on Gel Strength

PVP Concentration % (A)	Chitosan Concentration % (B)	Ratio A:B (weight)	Gel Strength (Pa)
20.0	2.0	1:1	500
20.0	2.0	2:1	380
20.0	3.0	1:1	500
20.0	3.0	2:1	750



Moisturizing Cream

Phase	Ingredient	% Wt.	Supplier	INCI Name
A.	Aquatrix II Part A	2.0	Hydromer Inc.	PVP/Water
	Propylene Glycol	4.0	BASF	Propylene Glycol
	Methyl Paraben	0.2	Inolex	Methyl Paraben
	Water	58.9		
	Triethanolamine 99%	1.8	BASF	Triethanolamine
B.	Aquatrix II Part B	4.0	Hydromer Inc.	Chitosan/ Water
	Glyceryl Sterate& PEG 100 Stearate	6.0	Inolex	Lexemul 561
	Stearic Acid	6.0	Spectrum	Stearic Acid
	Cetyl Alcohol	1.0	Henkel	Cetyl Alcohol
	Isopropyl Myristate	15.0	Henkel	Isopropyl Myristate
	Propyl Paraben	0.1	Bayer AG	Propyl Paraben
	Dimethicone	1.0	BASF	Dimethicone
	Fragrance	TBD		

Procedure:
Add Aquatrix II Part A to the water-glycol solution and dissolve, mix constantly. Then add Aquatrix II Part B and TEA. Heat Phase A in batch tank to 70°C. Heat Phase B in separate container to 75°C. Add Phase B to A at this temperature, begin cooling to room temperature, and qs to volume with cold water at 50°C.

Shaving Lotion

Phase	Ingredient	% Wt.	Supplier	INCI Name
A.	Water	64.3		
	Glucam P-20		Amerchol	PPG-20 Methyl Glucose Ether
	AquatrixII Part A	25.5	Hydromer Inc.	PVP/Water
B.	AquatrixII Part B	2.0	Hydromer Inc.	Chitosan/Water
	Allantoin	0.2	ICI	Allantoin
	PEO WSR-25	3.0	Amerchol	PEO WSR-25
	Fragrance	TBD		

Procedure:
Add Phase A and mix until homogenous. Add Phase B with agitation, and mix until all solids are dissolved.

Facemask Gel

Phase	Ingredient	% Wt.	Supplier	INCI Name
A.	Aquatrix II Part A	50.0	Hydromer Inc.	PVP/Water
B.	Aquatrix II Part B	50.0	Hydromer Inc.	Chitosan/Water
	Cosmetic ingredient (optional)	TBD		
	Fragrance	TBD		

Procedure:
Add Phase A, begin agitation. Add cosmetic additive into Phase B if needed. Mix Phases A and B in a 1:1 ratio. Apply to substance or release liner.

After Shave Lotion

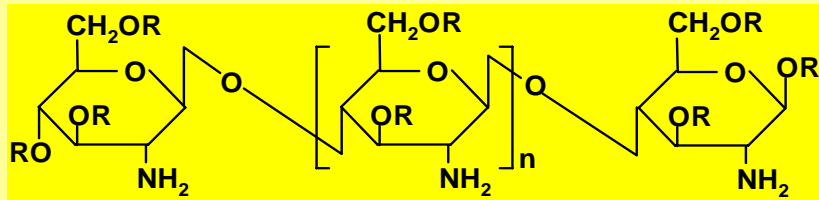
Phase	Ingredient	% Wt.	Supplier	INCI Name
A.	Water	37.0		
	Glucam P-20	5.0	Amerchol	PPG-20 Methyl Glucose Ether
	Aquatrix II part A	25.0	Hydromer Inc.	PVP/Water
B.	Aquatrix II Part B	0.5	Hydromer Inc.	Chitosan/Water
	Allantoin	0.2	ICI	Allantoin
C.	SDA	30.0		
	Menthol	0.2	Spectrum	Menthol
	Fragrance	TBD		

Procedure:
Add Phase A and mix until homogenous. Add Phase B with agitation, and mix until all solids are dissolved. Add Phase C and mix thoroughly.

Aquatrix II Hydrogel

Chitosan-Poly(vinyl pyrrolidone) Gel Formation

Carboxymethyl chitosan



(R= H, CH₂COOH)

Poly(vinyl pyrrolidone)

