



NORLAND PRODUCTS INCORPORATED

1095 Cranbury S. River Rd, Ste 20, Jamesburg, NJ 08830

Tel • 609-395-1966 Fax • 609-395-9006

Website: www.norlandproducts.com

Norland HiPure Liquid Gelatin

Norland HiPure Liquid Gelatin is a specifically purified gelatin with an average molecular weight of 60,000. It is unique because, although it has the same basic chemical constituents as animal gelatin, they are in different proportions. HiPure Liquid Gelatin has lower amounts of proline and hydroxyproline, the amino acids responsible for hydrogen bonding in gelatin. This allows water solutions of our gelatin to remain liquid at room temperature, even in high concentrations.

HiPure Liquid Gelatin has properties and reactivities similar to animal gelatin, but offers much easier handling characteristics. It can be mixed into water with simple stirring and the solution does not have to be heated to remain fluid. This opens a new field to manufacturers who never considered the chemical characteristics of gelatin before because of the gel properties.

Features of HiPure Liquid Gelatin:

- Supplied as a pourable liquid.
- Completely water soluble.
- Acts as a protective colloid to suspend small particles or monomers in solution.
- Excellent adhesion to metal, rubber, glass, leather, cork, wood and paper.
- Insoluble in organic solvents.
- Coatings can be made water resistant and insoluble in water.
- Dries to a hard, smooth finish.
- Coatings will accept water soluble dyes.
- Compatible with a wide variety of water soluble monomers.

As an alternative to regular gelatin, HiPure Liquid Gelatin can be used for silver emulsions, for subbing films, as a wash off coating in graphic arts, and for dichromated coatings used in photoresists. It is also an excellent material for use in formulating leather finishes, or it can be used as a substantive protein in personal care products.

HiPure Liquid Gelatin can be combined with animal gelatin to lower the gel or melting point of the latter, and to make the animal gelatin more water soluble. Water solutions of animal gelatin will normally gel at 30-35°C. This can be reduced to as low as 15°C with appropriate amounts of HiPure Liquid Gelatin. The combination will have excellent film forming properties.

Typical Physical Properties	
Color	Clear, light amber
Solids	45% in water
Viscosity @ 70°F	6000 cps. Minimum
Average Molecular Wt.	60,000
Gel Point	5-10°C
Ash	< 2%
Preservatives	Methyl/Propyl para-Hydroxybenzoates
pH	4.5 - 6.0

Chemical Properties

Norland HiPure Liquid Gelatin is a protein molecule consisting of a complex chain of 20 amino acids. It is amphoteric in nature and offers a variety of reactive end groups, including hydroxy (OH), carboxy (COOH), and amino end groups (NH₂). Reactivity will depend on the pH of the gelatin solution with amino end groups reacting on the alkaline side, and carboxy end groups reacting on the acid side. Large amounts of acids and bases should be avoided, as the gelatin will degrade in time at pH below 3.0 or above 9.0.

Although HiPure Liquid Gelatin is very water soluble, it can be made insoluble by the addition of polyvalent ion salts such as aluminum sulfate, ferric sulfate, or chrome alum. Acid chromates will also insolubilize the gelatin as the chromate will oxidize it and be reduced to trivalent chromium. Formaldehyde, gluteraldehyde, and glyoxal will likewise react with gelatin to insolubilize it.

Dry films of HiPure are hard and somewhat brittle. If a flexible film is desired, it can be plasticized with a humectant such as glycerin or a glycol. Use 5 - 10% based on dry weight.

Although dried films are insoluble in organic solvents, the liquid gelatin will tolerate certain water miscible solvents.

Here are the toleration levels of various solvents in 100 parts of 45% Liquid Gelatin solution:

Ethyl Alcohol	50 parts
Acetone	25 parts
Methyl cellosolve	95 parts
Dimethyl formamide	110 parts

The following materials have shown compatibility with HiPure Gelatin:

Trade Name	Product	Manufacturer
	N-methylolacrylamide	American Cyanamid
	Acrylamide	American Cyanamid
	N, N-methylenebisacrylamide	American Cyanamid
Acrysol G.S.	Sodium polyacrylate	Rohm & Haas
Acrysol G-110	Ammonium polyacrylate	Rohm & Haas
ASE-95, Sodium Salt	Polyacrylic acid (thickener)	Rohm & Haas
Acrysol ASE 75	Acrylic Emulsion	Rohm & Haas
CMC-All Grades	Carboxy methyl cellulose (thickener)	Hercules
Gantrez AN	Vinyl ether copolymer	GAF
Gum Arabic	Gum Arabic	Stein Hall
Geon 151	Polyvinyl chloride latex	B.F. Goodrich
Hycar 1571	Butadiene acrylonitrile latex	B.F. Goodrich
Ludox A M	Colloidal silica	DuPont
Ludox H S	Colloidal silica	DuPont
Nalcoag 10-30	Colloidal silica	Nalco Corp
Nalcoag D-2036	Colloidal silica	Nalco Corp
Neoprene 400	Neoprene latex	DuPont
Neoprene 950	Neoprene latex	DuPont
Resyn 1006	Polyvinyl acetate	National Starch
Rhoplex B-85	Acrylic emulsion	Rohm & Haas

Films cast from mixtures are generally clear. When mixing emulsions with gelatin, special care must be taken to avoid undue localized concentrations which might tend to coagulate the emulsion. If water is to be added to the formula, dilution of the emulsion or latex before adding to the gelatin is suggested.

HiPure for Photographic Coatings

HiPure Liquid Gelatin is very suitable for use in photographic applications. It is deionized in the manufacturing process to remove all salts and the low molecular weight organic impurities. This gives a very pure gelatin with low ash. It should be noted that HiPure has no cysteine and very little methionine in its composition, so it is very low in sulphur.

HiPure's greatest advantage for photographic coatings is the fact that water solutions remain flowable liquids at room temperature which eliminates many of the handling problems associated with gelatin. Our liquid gelatin eliminates the need for heated coating equipment and its critical temperature and viscosity control. It mixes quickly into water with simple stirring and eliminates the problem of undissolved gelatin which cause coating flaws. HiPure also allows higher solid solutions to be formulated with the inherent advantage of faster drying time. No other gelatin is as easy to use in photographic coatings as HiPure Liquid Gelatin.

What it is:

Norland HiPure Liquid Gelatin is classified as a teleostean gelatin. This means that it is extracted from the skin of cold water fish. This unique source gives a gelatin with a naturally different proportion of the basic amino acids as compared to animal gelatin.

A notable difference is the lower amount of proline and hydroxyproline in HiPure. These amino acids are responsible for the gel characteristic normally attributed to gelatin. The lack of them in HiPure is its unique advantage. HiPure also has a higher proportion of serine, a hydroxy functional amino acid. This contributes to the greater adhesion it shows to many substrates. The small variations in the other amino acids may offer advantages for specific applications but for the most part provide similar characteristics to both types of gelatin.

Safety & Handling

Norland HiPure Liquid Gelatin is nontoxic because it contains only pure gelatin and a combination of nontoxic preservatives. Since it is a protein material, further dilution with water will require additional preservative to prevent bacterial attack.